Washer-Extractor

SP Series Installation and Operation Manual

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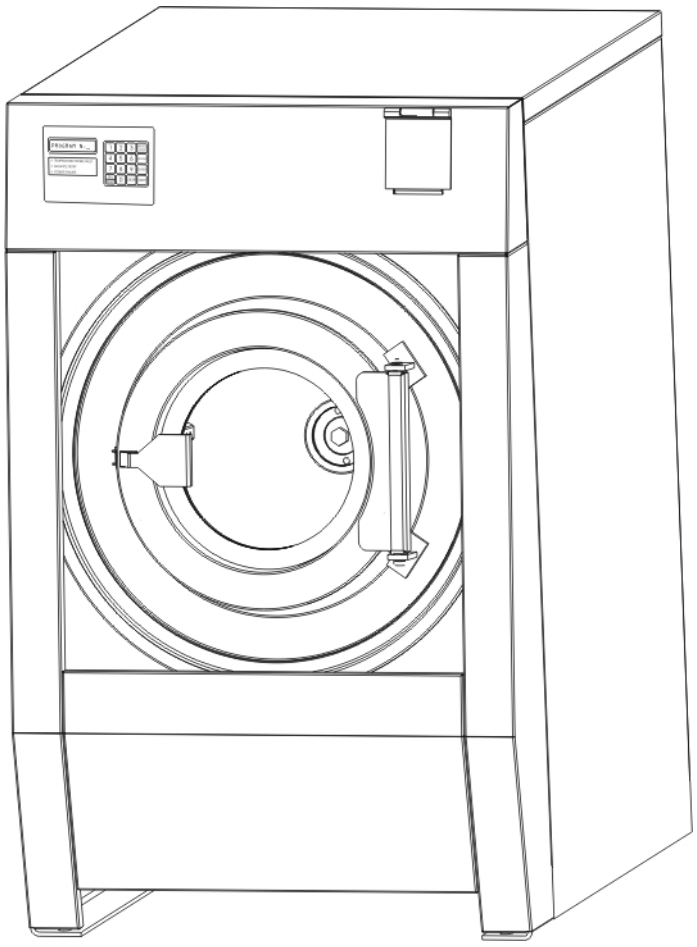

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SP Model Family Options

B&C Technologies

Family	*Capacity*	*Control*	*Voltage*	-
SP	40 / 45	E-EL6	2 - 200-240V, 50/60Hz, 3ph	
	50	F-FM7	4 - 380-480V, 50/60Hz, 3ph	
	60 /65			
	75			
	100 / 110			
	130 / 135			
	155 / 165			
	185 / 195			

Fills	*Dispenser*	*Drains*	*Heat*	*Prep*	-
1 - Cold	1 - 1 Cup	A - 1 Rear	N - None	N - None	
2 - Cold, Hot	5 - 5 Cup	B - 2 Rear	E - Electric	F - EMI Filter	
3 - Cold, Hot, Aux			S - Steam	O - Ozone	

Approvals	*Packing*	*Design Rev.*
A - USA	B - Bag	A
E - Europe	C - Crate	
N - None		

Figure 1: SP Product Family

Chapter 1

Important Instructions

1.1 Before Attempting Repairs

WARNING

Moving parts can cause serious injury or death. Before attempting repairs, follow proper shutdown procedures and remove power before commencement of service.

Safety is of primary concern with any maintenance or repair operation. If you are in any way unsure of how to proceed with a repair or adjustment, consult this manual, a qualified maintenance technician, your local distributor, or the B&C Technologies Technical Service Department at 850-249-2222.

Only trained and experienced personnel should attempt maintenance or repair work on this equipment. Follow all safety procedures including lock-out/tag-out procedures carefully. Ensure that any loose fitting clothing or jewelry is tucked in or not worn to avoid being pulled into the machine. Remember, the machine has no brain - you must use your own.

Before attempting repairs, follow proper shutdown procedures and remove power before commencement of service.

Never attempt to clean or service any area of the machine without removing power at the main disconnect.

Read, follow, and obey these safety rules! The B&C Technologies Technical Service Department

is available to answer any questions you may have about the operation and servicing of your machine. Please call with any questions or concerns about the operation of your machine.

1.2 Parts Ordering Information

If you require literature or spare parts, please contact your local distributor. If a local distributor is unavailable, you may contact B&C Technologies directly at (850) 249-2222 for the name of your nearest parts dealer.

For technical assistance in the United States, contact B&C Technologies:
(850) 249-2222 Phone
(850) 249-2226 FAX
parts@bandctech.com
www.bandctech.com

1.2.1 Nameplate Location

When contacting B&C Technologies about your equipment, please make note of the model and serial number, located on the nameplate as shown in figure 1.1.

1.3 Key Symbols

Anyone operating or servicing this machine must follow the safety rules in this manual. Particular attention must be paid to the DANGER, WARNING, and CAUTION blocks which appear throughout the manual and shown in figures 1.2 on page 5 and 1.3 on page 5.

1.4 Safety Information

Installation Notice: For personal safety and for proper operation, the machine must be grounded in accordance with state and local codes and in the USA in accordance with the National Electric Code, article 250-96. Elsewhere, the equipment should be grounded in accordance with ANSI/NFPA 70, or the Canadian Electrical Code, CSA C22.1. The ground connection must be to a proven earth ground, not to conduit or water pipes.

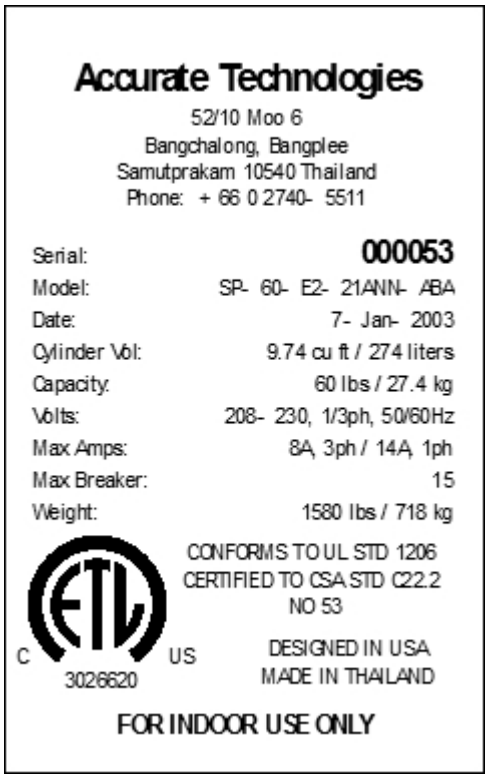

Figure 1.1: Serial Decal

1.5 Installation and Operational Safety Instructions

1. Read all instructions prior to operating this equipment.
2. Ensure that the equipment is properly grounded before applying power and operation commences.
3. Do not allow children to play in or around or operate this equipment.
4. Check the operation of all safety interlocks at the start of every shift. If the interlocks do not stop the equipment immediately, the machine must be removed from service. Notify your immediate supervisor, and do not operate the machine.
5. Never attempt to service the machine while it is running. Never reach over, under, around, or behind any safety device, or into any area near moving parts or hot surfaces without shutting off power and allowing the machine to adequately cool.
6. Read, understand, and follow all safety instructions. Do not come close to moving parts and hot surfaces. Do not wear loose clothing, jewelry, neckties, or any other garment that could be come caught in the machine while operating or near the machine.
7. Only a qualified technician should attempt to service or repair the machine.
8. Do not install the machine in an area where it could be exposed to water or weather.
9. Do not alter or tamper with the control system.

WARNING
To prevent serious injury or death, read machine manuals before installing, operating, serviceing, or cleaning machine.
WARNING
Moving parts hazard.
Can cause serious injury.
Do not operate unless all guards and covers are in place.
Do not put hands/fingers beyond guard/cover.
WARNING
To prevent serious injury, before service or cleaning:
•Disconnect all utilities such as air, steam, gas and electricity
•Release any residual air.
•Allow heated parts to cool.
WARNING
Moving parts hazard.
Can cause serious injury.
Do not operate unless all guards and covers are in place.
Do not put hands/fingers beyond guard/cover.
WARNING
Electrical hazard inside.
Can cause death or serious injury.
Turn off and lockout/tagout all electrical power before opening.
CAUTION
Burn hazards.
•Contact with machine components or hot goods can burn you.
•Do not operate unless all guards and covers are in place.
•Use care when handling recently processed or dried goods.

Figure 1.2: Key Symbols

WARNING
Toxic and fire hazzards.
Machine produces gases, fumes and lint which may be toxic or catch fire and could result in serious injury or death.
Vent exhaust outdoors and regularly clean lint away from machine.
WARNING
To prevent serious injury or death:
Before removing jams, servicing, cleaning, or adjusting equipment, turn off all electrical power and other utilities.
Follow lockout/tagout procedures.
Do not operate equipment without all guards, belts, and tapes in place.

Figure 1.3: Key Symbols

10. Keep the interior and exterior of the machine clean of lint, dirt, dust and debris.
11. Always disconnect the electrical service from the machine before performing service.

12. This machine must be installed according to the installation instructions. All utility connections must comply with state and local codes and must be made by a licensed installer where required.

Chapter 2

Introduction

The B&C SP Series is the professional freestanding washer-extractor series of machines from B&C Technologies. It is an open pocket washer-extractor with a large door opening for easy and quick loading and unloading. It has been developed for the on premise market, and is suitable for commercial laundries, hotel and other places where laundry might be processed

The design allows for top performance at lowest possible operation cost and investment. The flexible electronic control center ensures that maximum productivity is obtained.

The SP series utilizes high quality material, such as 304 (18/8) stainless steel in vital parts in contact with the wash solution. It has a stainless steel cabinet for long life with easily removable panels.

The key advantages of this series are the simplicity of the microprocessor and the electronic AC drive system, which utilizes only one motor. The system allows for washing and extraction at any speed and mechanical action to suit any textile fiber used today and tomorrow. A built in suspension system isolate objectionable vibrations and the high speed final extraction saves time and energy in the finishing operation.

A single compartment supply dispenser for powder and liquid detergents is standard (five compartment optional) and the machine is designed to accept the connection of 8 additional external chemical lines and pumps.

The SP series is also prepared to accept the connection of water reuse systems. These systems can be installed separate or on top of the machine. They are available in either single or dual tanks for maximum savings of water up to 40%. The tanks can be equipped with or without steam or electrical heat depending on installation and operation. The water reuse system is programmable by the machines electronic control center.

Wetcleaning and Ozone integration are also possible with the SP series, making them the most flexible machine available today.

2.1 Customer Service

For technical assistance:
In the United States
Phone: (850)-249-2222
FAX: (850) 249-2226
e-mail: techsupport@bandctech.com
Web: www.bandctech.com

2.2 Replacement Parts

In the event that literature or replacement parts are required, contact the local distributor of the equipment, or contact B&C Technologies at the above phone numbers/internet addresses.

2.3 Theory of Operation

The B&C SP models use a single-speed motor to drive the cylinder via V-belts in all speeds. The cylinder is supported by two spherical roller bearings located in a cast steel bearing housing or split pillow block housings made of cast steel.

The motor is controlled by the computer control located in the front and the AC inverter drive located in the rear panel. Any speed can be programmed for any wash cycle. Some speed ranges are blocked out for programming due to safety reasons. These speed ranges are the ones that the machine cannot operate at due to its spring or suspension resonance. This speed range is not important and normally speeds for wash or extraction are not selected within this range. Any wash speed in the range of 3-50 RPM and extraction speeds 150-Maximum RPM can be programmed. Further any reversing action can be programmed. Normal reversing action is 16 seconds forward, pause for 4 seconds, and 16 seconds reverse. Any temperature between 70F to 200F (20-95C) can be programmed. Any water level in the range of the machine parameters can be programmed in centimeters. The computer will automatically provide safety levels for steam injections and door operations.

Water entry into the machine is through an air gap vacuum breaker utilizing electro-magnetic water valves controlled by the computer. By utilizing the air gap vacuum breaker, backflow into the water supply is impossible. The computer also controls the drain, supply dispenser, any external liquid supplies, steam injection and any other vital functions of the wash program. The computer can even record cycles and data of importance that could be used for maintenance purpose.

The steam, if installed, is injected in the bottom of the shell via a steam injector. The steam is controlled by a steam valve that is programmed by the EL6 / FM7 micro computer.

The cylinder is perforated, allowing water to pass through and drain from within during drain and extract steps. Lifting ribs inside the cylinder lift the load from the wash solution and allow the load to tumble and falling back into the solution when the load reaches the approximate 10-11

oclock or 1-2 oclock positions. This mechanical action removes soil from the fabric. Furthermore, the lifters are perforated on the top so that water can cascade over the goods and wet them quickly. This reduces water consumption as water is picked up at the cylinders lowest point and lifted and splashed over the goods at the highest point as the cylinder rotates.

A stainless steel door is provided for loading and unloading. A door lock system prevents operation of the machine when the door is open. The door is locked during operation utilizing a solenoid and a manual latch for safety reasons. The door lock is provided with a magnetic sensor to indicate that the machine is locked and provide for start of the machine when the door is closed and locked.

The AC drive, contactor, circuit overload protectors, input power supply connections, external supply connections, and control transformer are behind a cover on the rear of the machine.

The supply dispenser is mounted on the front of the machine and is accessed by opening the cover door. Supplies, both liquid and powder, may be added by pulling the dispenser cups out and placing the appropriate supply in each. Supplies are flushed into the machine at the proper time in the cycle, controlled by the microcomputer.

Holes are provided at the rear of the machine for connection to an external, central liquid supply unit. Electrical connections are provided for the liquid supply unit on a terminal strip inside the rear control module.

Chapter 3

General Specifications

MODEL	Metric	US	SP-45		SP-50		SP-65		SP-75	
Maximum Capacity	kg	lbs	20.5	45.0	22.7	50.0	29.6	65.0	34.1	75.0
Overall Dimensions										
A - Width	mm	in	925	36.4	925	36.4	1003	39.5	1003	39.5
B - Depth	mm	in	1093	43.0	1153	45.4	1231	48.5	1306	51.4
C - Height	mm	in	1466	57.7	1466	57.7	1615	63.6	1615	63.6
Wash Cylinder Information										
Cylinder Diameter	mm	in	680	26.8	680	26.8	789.94	31.1	789.94	31.1
Cylinder Depth	mm	in	515	20.3	575	22.6	558.8	22.0	633.73	25.0
Cylinder Volume	liters	cu ft	187	6.6	209	7.4	274	9.7	311	11.0
Motor										
Size	kW	HP	2.2	3	2.2	3	3.75	5	3.75	5
Cylinder Speeds (Programmable)										
Wash	G	rpm	0.8	46	0.8	46	0.8	42	0.8	42
Distribution	G	rpm	2	73	2	73	2	67	2	67
Intermediate Extract	G	rpm	150	829	150	829	150	583	150	583
High Extract 1	G	rpm	200	725	200	725	200	673	200	673
High Extract 2	G	rpm	250	811	250	811	250	753	250	753
High Extract 3	G	rpm	350	960	350	960	350	890	350	890
Door Opening										
Door Opening Diameter	mm	in	370	14.6	370	14.6	450	17.7	450	17.7
Height to Bottom of Door	mm	in	655	25.8	655	25.8	740	29.1	740	29.1
Drain System										
Overflow Size	mm	in	38.1	1.5	38.1	1.5	38.1	1.5	38.1	1.5
Drain Outlet Size	mm	in	60.452	2.38	60.452	2.38	76.2	3	76.2	3
Number of Drains	Standard	Optional	1	2	1	2	1	2	1	2
Steam Inlet										
Connection Size	NPT		1/2″		1/2″		1/2″		1/2″	
Water Inlet										
Connection Size	NPT		3/4″		3/4″		3/4″		3/4″	
Number of Inlets	Standard	Optional	2	3	2	3	2	3	2	3
Chemical Supply System										
Dry Chemical Compartments	Standard	Optional	1	5	1	5	1	5	1	5
Liquid Supply Connections	Standard	Optional	8	12	8	12	8	12	8	12
Liquid Supply Connection Size	NPT		1/2″		1/2″		1/2″		1/2″	
Weight and Shipping Information										
Net Weight	kg	lb	591	1300.2	615	1353	660	1452	687	1511.4
Shipping Weight	kg	lb	610	1342	634	1394.8	720	1584	747	1643.4
Electrical Service										
208-240VAC, 50/60HZ, 1PH	Amps	Breaker	8	15	9	15	14	15	14	15
208-240VAC, 50/60HZ, 3PH	Amps	Breaker	5	15	6	15	8	15	9	15
380-460VAC, 50/60HZ, 3PH	Amps	Breaker	3	15	3	15	4	15	4	15
208-240VAC, 50/60HZ, 3PH Heat	Amps	Breaker	48	60	49	60	52	60	53	60
380-460VAC, 50/60HZ, 3PH Heat	Amps	Breaker	24	30	25	30	26	30	27	30

Table 3.1: SP Series General Specifications

MODEL	Metric	US	SP-110		SP-135		SP-165		SP-195	
Maximum Capacity	kg	lbs	50.0	110.0	61.4	135.0	75.0	165.0	88.7	195.0
Overall Dimensions										
A - Width	mm	in	1204	47.4	1300	51.2	1538	60.6	1602	63.1
B - Depth	mm	in	1395	54.9	1600	63.0	1730	68.1	1784	70.2
C - Height	mm	in	1805	71.1	1765	69.5	1826	71.9	1894	74.6
Wash Cylinder Information										
Cylinder Diameter	mm	in	940	37.0	1067	42.0	1092	43.0	1174	46.2
Cylinder Depth	mm	in	690	27.2	660	26.0	757	29.8	780	30.7
Cylinder Volume	liters	cu ft	479	16.9	590	20.8	709	25.0	844	29.8
Motor										
Size	kW	HP	7.5	10	7.5	10	11	15	15	20
Cylinder Speeds (Programmable)										
Wash	G	rpm	0.8	39	0.8	36	0.8	36	0.8	35
Distribution	G	rpm	2	62	2	64	2	64	2	62
Intermediate Extract	G	rpm	150	535	150	360	150	360	150	380
High Extract 1	G	rpm	200	618	200	515	200	480	200	465
High Extract 2	G	rpm	250	690	250	600	250	600	250	580
High Extract 3	G	rpm	350	817	350	767	350	725	350	700
Door Opening										
Door Opening Diameter	mm	in	508	20.0	509	20.0	635	25.0	635	25.0
Height to Bottom of Door	mm	in	800	31.5	820	32.3	830	32.7	870	34.3
Drain System										
Overflow Size	mm	in	38.1	1.5	63.5	2.5	63.5	2.5	63.5	2.5
Drain Outlet Size	mm	in	76.2	3	101.6	4	102	4	101.6	4
Number of Drains	Standard	Optional	1	2	1	2	1	2	1	2
Steam Inlet										
Connection Size	NPT		3/4″		1″		1″		1-1/4″	
Water Inlet										
Connection Size	NPT		1″		1″		1″		1-1/4″	
Number of Inlets	Standard	Optional	2	3	2	3	2	3	2	3
Chemical Supply System										
Dry Chemical Compartments	Standard	Optional	1	5	5		5		5	
Liquid Supply Connections	Standard	Optional	8	12	8	12	8	12	8	12
Liquid Supply Connection Size	NPT		1/2″		1/2″		1/2″		1/2″	
Weight and Shipping Information										
Net Weight	kg	lb	1068	2349.6	1790	3938	1910	4202	2090	4598
Shipping Weight	kg	lb	1091	2400.2	1809	3980	1955	4301	2135	4697
Electrical Service										
208-240VAC, 50/60HZ, 1PH	Amps	Breaker	31	40	n/a	n/a	n/a	n/a	n/a	n/a
208-240VAC, 50/60HZ, 3PH	Amps	Breaker	18	20	26	60	32	40	58	60
380-460VAC, 50/60HZ, 3PH	Amps	Breaker	9	15	13	20	16	25	29	30
208-240VAC, 50/60HZ, 3PH Heat	Amps	Breaker	78	80	n/a	n/a	n/a	n/a	n/a	n/a
380-460VAC, 50/60HZ, 3PH Heat	Amps	Breaker	39	40	n/a	n/a	n/a	n/a	n/a	n/a

Table 3.2: SP Series General Specifications

Chapter 4

Installation

4.1 Receiving Inspection

Upon receipt of the equipment, visually inspect for shipping damage and note any damage with the carrier before signing the shipping receipt, or advise the carrier of the damage as soon as it is noted.

If damage is discovered, a written claim must be filed with the carrier as soon as possible.

Note: Warranty is VOID unless the equipment is installed according to instructions. The installation must comply with the minimum requirements listed in this manual. All national, state and local codes must be followed including but not limited to gas, electrical, plumbing and HVAC. Due to various requirements, statutory codes should be well understood before installation commences.

Important: The machine should be transported and handled in an upright position.

4.2 Safety Checklist

Before Initial start up of a B&C free-standing washer extractor perform the following safety check:

1. Make sure all electrical and plumbing connections have been made in accordance with applicable codes and regulations.
2. Make sure the machine is grounded electrically.
3. Make sure the machine has flexible water fill and drain connections of the correct size, length and type, with no kinks, and that they are securely attached and/or clamped.
4. Make sure the transport brackets have been removed.

Before machine is placed in operation, the door safety interlock must be checked for proper operation as follows:

Before servicing any equipment, make certain it is disconnected from the electrical power source. Never allow operation of the machine when any safety device is malfunctioning. Never bypass safety devices.

Never insert hands or objects into basket until it has completely stopped. Doing so could result in serious injury.

1. When the washer is energized electrically and in operation, the loading door must be locked in the closed position. Verify this by attempting to open the loading door when the machine is operating. If necessary, check the door safety interlock and sensors for proper operation. Consult the service manual, or call a qualified service technician if necessary.
2. When the washers loading door is open, it should not be possible to start the machine. Verify this by attempting to start the washer with the door open. Also, close the door without locking it and verify that it is not possible to start the machine with the door not locked. If necessary, check the door lock sensors for proper operation,. Consult the service manual, or call a qualified service technician. If additional information is required, contact your local distributor or call the manufacturer of the machine.

- To provide personal safety and keep the machine in proper working order, follow all maintenance and safety procedures presented in this manual. If questions regarding safety arise. Contact the factory immediately.
- Use factory authorized spare parts to avoid safety hazards.

4.2.1 Operator Safety

To ensure the safety of machine operators the following maintenance checks must be performed daily.

1. Prior to operating the machine, verify that all warning signs are present and legible. Missing or illegible signs must be replaced immediately. Make certain that spares are available.
2. Check door interlock before starting operation of the machine, see safety check list.
3. Do not attempt to operate the machine if any of the following conditions are present:
   (a) The door does not remain securely locked during the entire cycle.
   (b) Excessively high water level is evident.
   (c) Machine is not connected to a properly grounded circuit.

Do not bypass any safety devices in the machine.

Never operate the machine with a bypassed or disconnected out-of-balance switch. Operating the machine with severe out-of-balance loads could result in personal injury and serious equipment damage.

Do not place volatile or flammable fluids in any machine. Do not clean the machine with volatile or flammable fluids such as acetone, lacquer thinners, enamel reducers, carbon tetrachloride, gasoline, benzene, naphtha, etc. Doing so could result in serious personal injury and/or damage to the machine.

4.2.2 Safe Operation Environment

Safe operation requires an appropriate operating environment for both the operator and the machine. If questions regarding safety arise, contact the factory.

4.2.3 Environmental Conditions

1. Ambient temperature. Water in the machine will freeze at temperatures of 32F (0C) or below. Temperatures above 120 F (50C) will result in more frequent motor overheating and, in some cases, malfunction or premature damage to solid state devices that are used in the machines. Special cooling devices may be necessary.

2. Humidity. Relative humidity above 90% may cause the machines electronics or motors to malfunction or may trip the ground fault interrupter. Corrosion problems may occur on some metal components. If the relative humidity is below 30% belts and rubber hoses may eventually develop dry rot. This condition can result in hose leaks, which may cause hazards external to the machine in conjunction with adjacent electrical equipment.

3. Ventilation. The need for make-up air openings for such laundry room accessories as dryers , ironers, water heaters, etc. must be evaluated periodically. Louvers, screens, or other separating devices may reduce the available air opening significantly.

4. Radio Frequency Emissions. A filter is available for machines in installations where floor space is shared with equipment sensitive to radio frequency emissions. All machines that are shipped to CE countries are equipped with this filter and comply with the EMI regulations.

5. Elevation. If the machine is to be operated at elevations over 3280 feet (1000 meters) above sea level, pay special attention to water levels and electronic settings (particularly temperature) or desired result may not be achieved.

6. Chemicals. Keep stainless steel surfaces free of chemical residues to avoid corrosion.

7. Water damage. Do not spray the machine with water. Short circuiting and serious damage may result. Repair immediately all seepage due to faulty gaskets, etc.

Replace all panels that are removed to perform service and maintenance procedures. Do not operate the machine with missing guards or with broken or missing parts. Do not bypass any safety devices.

4.2.4 Machine Location

1. Foundation. The concrete floor must be of sufficient strength and thickness to handle the floor loads generated by the machine at high extract speeds.

2. Service/ Maintenance Space. Provide sufficient space to allow comfortable performance of service procedures and routine maintenance. This is especially important in connection with machines equipped with AC inverter drives. Consult installation instructions for specific details.

4.2.5 Input and Output Services

1. Water pressure. Best performance will be realized if water is provided at a pressure of 30-85 psi (2.0-5.7 bar). Although the machine will function properly at lower pressure, increased fill time will occur. Water pressure higher than 120 psi (8.0 bar) may result in damage to machine plumbing. components failure (s) and personal injuries.

2. Optional Steam heating pressure. Best performance will be realized if steam pressure is provided at a pressure of 30-80 psi (2.0-5.4 bar). Steam pressure higher than 125 psi (8.5 bar) may result in damage to steam components and may cause personal injuries. For machines equipped with optional steam heat, install piping in accordance with approved commercial steam practices. Failure to install a steam filter may void the warranty.

3. Drainage System. Provide drain lines or troughs large enough to accommodate the total quantity of water that could be dumped if all machines on the site drained at the same time from the highest attainable level. If drain troughs are used, they should be covered to support light foot traffic

4. Power. For personal safety and for proper operation, the machine must be grounded in accordance with state and local codes. The ground connection must be to a proven earth ground, not to conduits or water pipes. An easy-access disconnect switch should be provided.

Ensure that a ground wire from a proven earth ground is connected to the ground lug in the electrical junction box on this machine. Without proper grounding personal injury from electrical shock could occur and machine malfunctions may be evident. Computer-controlled machines must have a proper ground to prevent computer malfunctions.

Always disconnect power and water supplies before a service technician performs any service procedure. Where applicable, steam and/or compressed air supplies should also be disconnected before service is performed.

4.2.6 Inverter Drive

Machines equipped with AC drives require special attention with regard to the operating environment.

1. An especially dusty or linty environment will require more frequent cleaning of the AC drive cooling fan filter and of the AC drive itself.
2. Power line fluctuations from sources such as an uninterruptible power supplies (UPS) can adversely affect machines equipped with the AC drive. Proper suppression devices should be utilized on the incoming power to the machine to avoid problems.
3. A clean power supply free from voltage spikes and surges is absolutely essential for machines equipped with the AC drive. Nonlinear inconsistencies (peaks and valleys) in the power can cause the AC drive to generate nuisance errors. If voltage is above 230V for 200 V installations or above 460V for 400V installations, a buck/boost transformer is recommended. If voltage is above 240V or 480V, a buck/boost transformer is required unless the factory advises differently.
4. Sufficient space to perform service procedures and routine preventive maintenance is especially important for machines equipped with AC drives.

4.2.7 Machiner Misuse

Even though this machine is an atmospheric vessel, never use it for any purpose other than washing fabrics.

1. Never wash petroleum-soaked rags in the machine. This could result in an explosion.
2. Never wash machine parts or automotive parts in the machine. This could result in serious damage to the wash cylinder.
3. Never stone wash in the machine. It could wear the wash cylinder and serious damage might occur to the machine.
4. Never use the machine for dyeing nor with harsh chemicals that can cause corrosion and other health hazards.
5. Never allow children to play on or around this machine. Death or serious injury can result if children become trapped in the machine. Do not leave children unattended while the machine door is open. These cautions apply to animals as well.

4.3 Dimensional Clearances

When installing the washer-extractor, it is important to allow adequate clearance on all sides of the machine. When multiple machines are installed, it is important to allow for the specified minimum clearances between machines. The following table shows recommended minimum clearances for the various freestanding models.

Note: The dimensions are approximate and subject to normal manufacturing tolerances. If exact dimensions are required for construction purposes, request certified drawings from the factory. We reserve the right to make changes at any time without notice.

	UNITS Metric	UNITS US	SP-40 through SP-110				SP-130 thru SP-195			
			Recommended		Minimum		Recommended		Minimum	
(A) Minimum rear clearance	mm	in	760	30	305	12	760	30	305	12
(B) Minimum clearance between machine and wall	mm	in	455	18	25	1	610	24	455	18
(C) Minimum clearance between machines	mm	in	455	18	25	1	610	24	455	18
(D) Minimum front clearance	mm	in	838	33	838	33	838	33	838	33

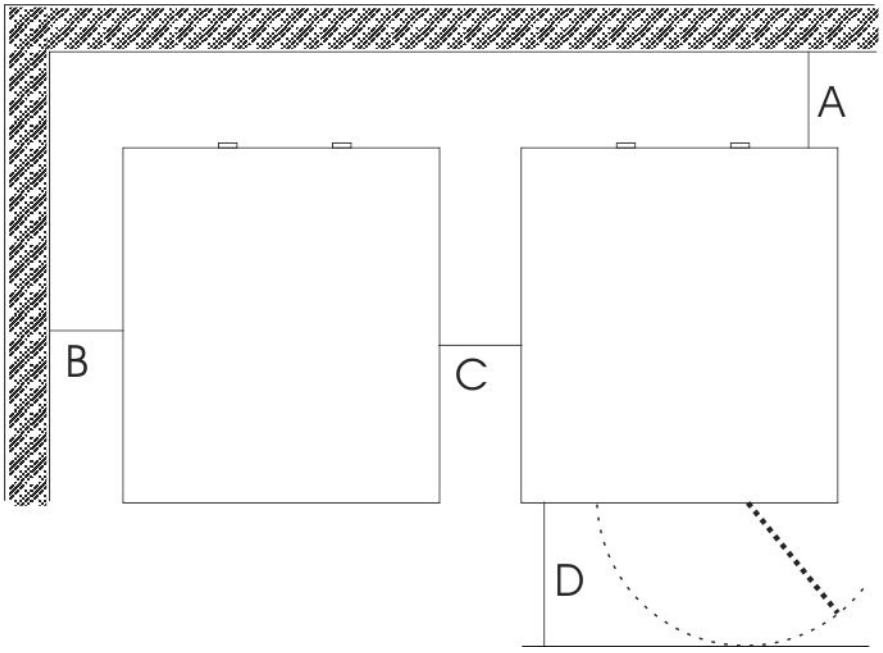

Figure 4.1: Minimum Service Clearances

4.4 Machine Foundation

Thoroughness of details must be stressed with all foundation work to insure a stable unit installation, eliminating possibilities of excessive vibrations during extraction.

For a successful installation, a smooth level surface, so that the entire base of the machine is supported and rests on the mounting surface, is absolutely requried.

Note: Do not support the machine on only four points.

Note: Freestanding washer-extractors do not require anchoring bolts unless specified by state or local codes. However it is always recommended that the machines be anchored.

Special care must be taken when machines are installed on an upper floor. Make sure that the floors are designed to carry the static and dynamic loads of the machines. Further vibrations should be taken into consideration so that the machine does not create vibrations in the building. Static and dynamic loads on the floor or foundation are shown in the figure 4.1 on page 19. This table can be used as reference when designing floors and foundations. See the figures beginning on page 20 for mounting bolt layout measurement and pattern.

Table 4.1: Floor Load Data

	Static floor load		Static pressure		Dynamic floor load		Dynamic pressure		Dynamic Frequency
	kN	lbs	kN/m2	lbs-ft2	kN	lbs	kN/m2	lbs-ft2	Hz
SP-45	7.28	1635	7.21	150	2.8	631	2.8	58	16
SP-50	7.64	1718	7.17	150	3.1	701	2.9	61	16
SP-65	8.41	1890	6.8	142	4	909	3.3	68	14.8
SP-75	8.9	2001	6.8	142	4.7	1048	3.6	74	14.8
SP-110	13.34	2999	7.95	166	6.9	1542	4.1	85	13.6
SP-135	14.88	3344	7.15	149	8.4	1893	4	85	12.8
SP-165	22.64	5089	8.5	178	9.4	2116	3.5	74	12.1
SP-195	24.53	5514	8.59	179	11.1	2505	3.9	81	11.7

4.4.1 Mounting Bolt Installation

All SP Machines use 1/2-13 bolts. Embed the bolts in 3500 psi reinforced concrete with a minimum of 4″′ thickness. The threaded end of the bolt should extend 2 inches from the surface of the floor. Grouting is recommended, but not required.

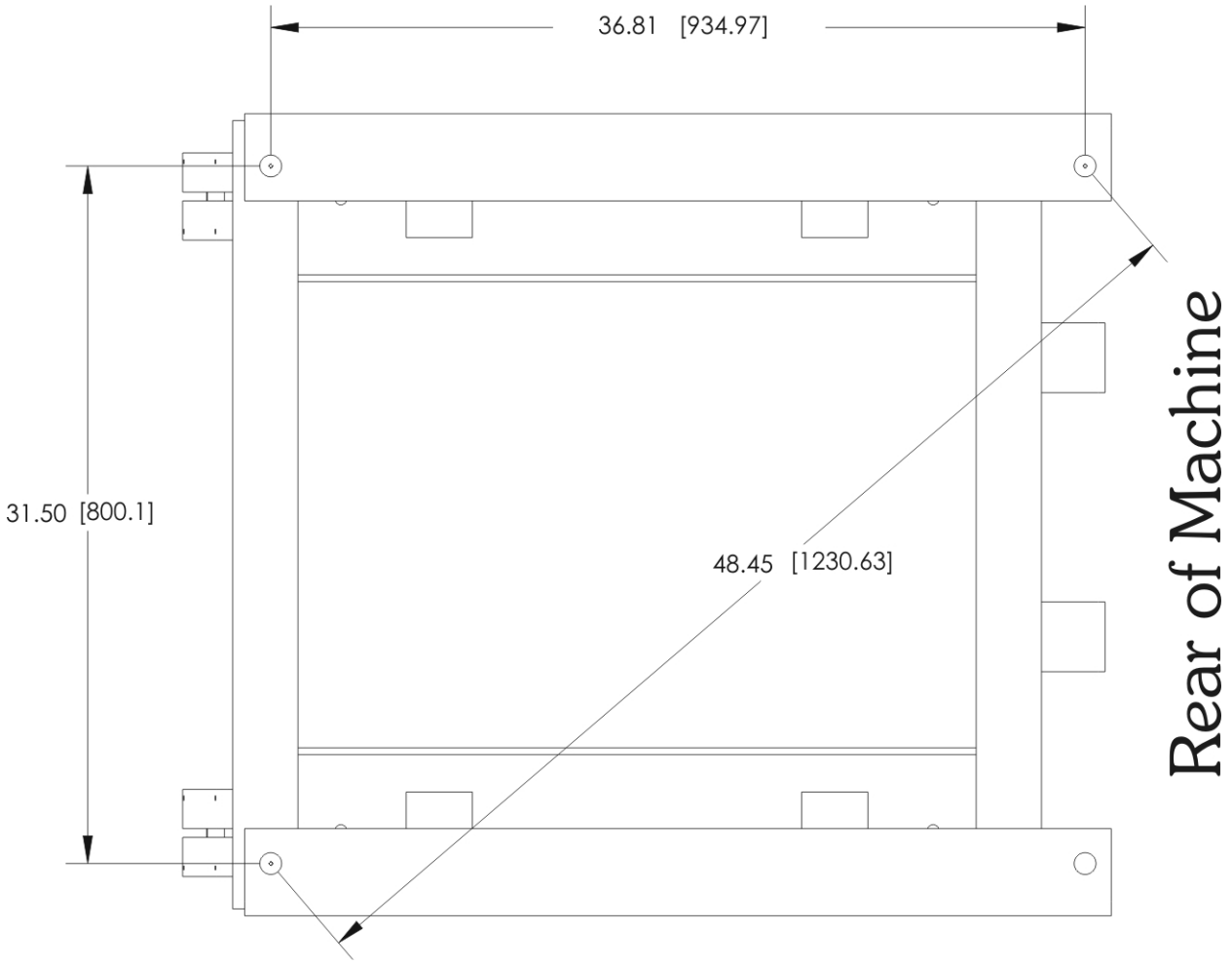

Figure 4.2: SP-40/45 Bolt Hole Layout

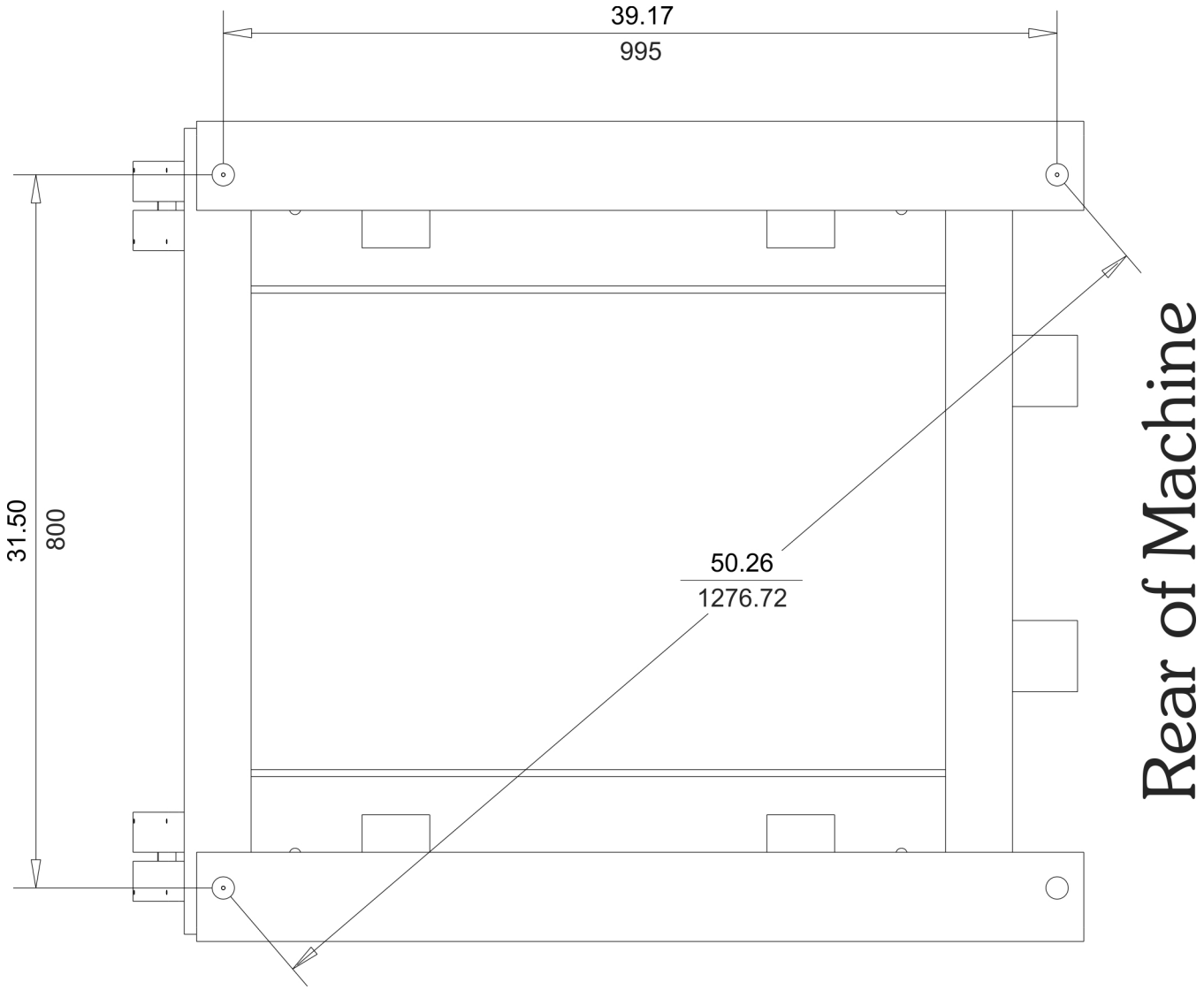

Figure 4.3: SP-50 Bolt Hole Layout

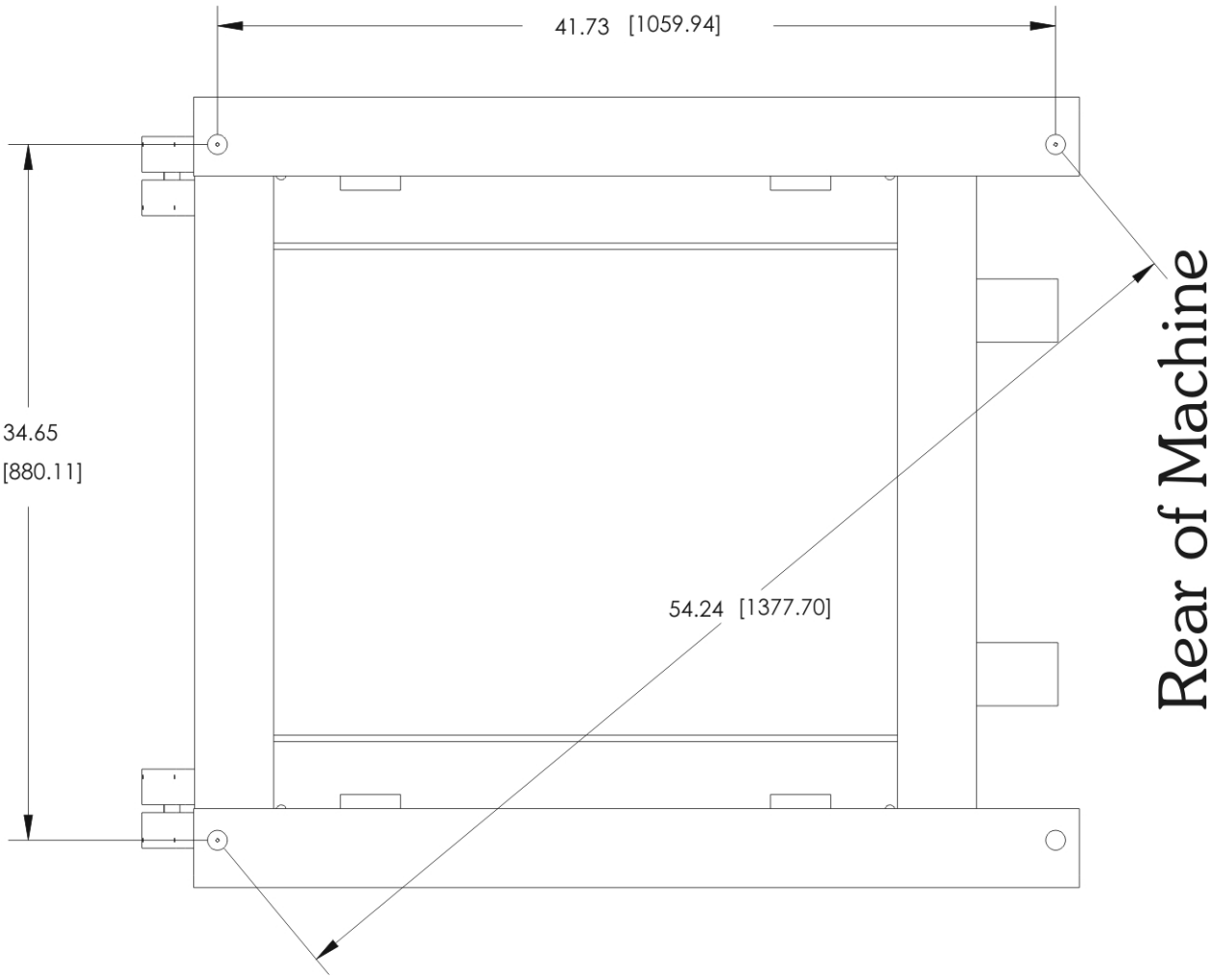

Figure 4.4: SP-60/65 Bolt Hole Layout

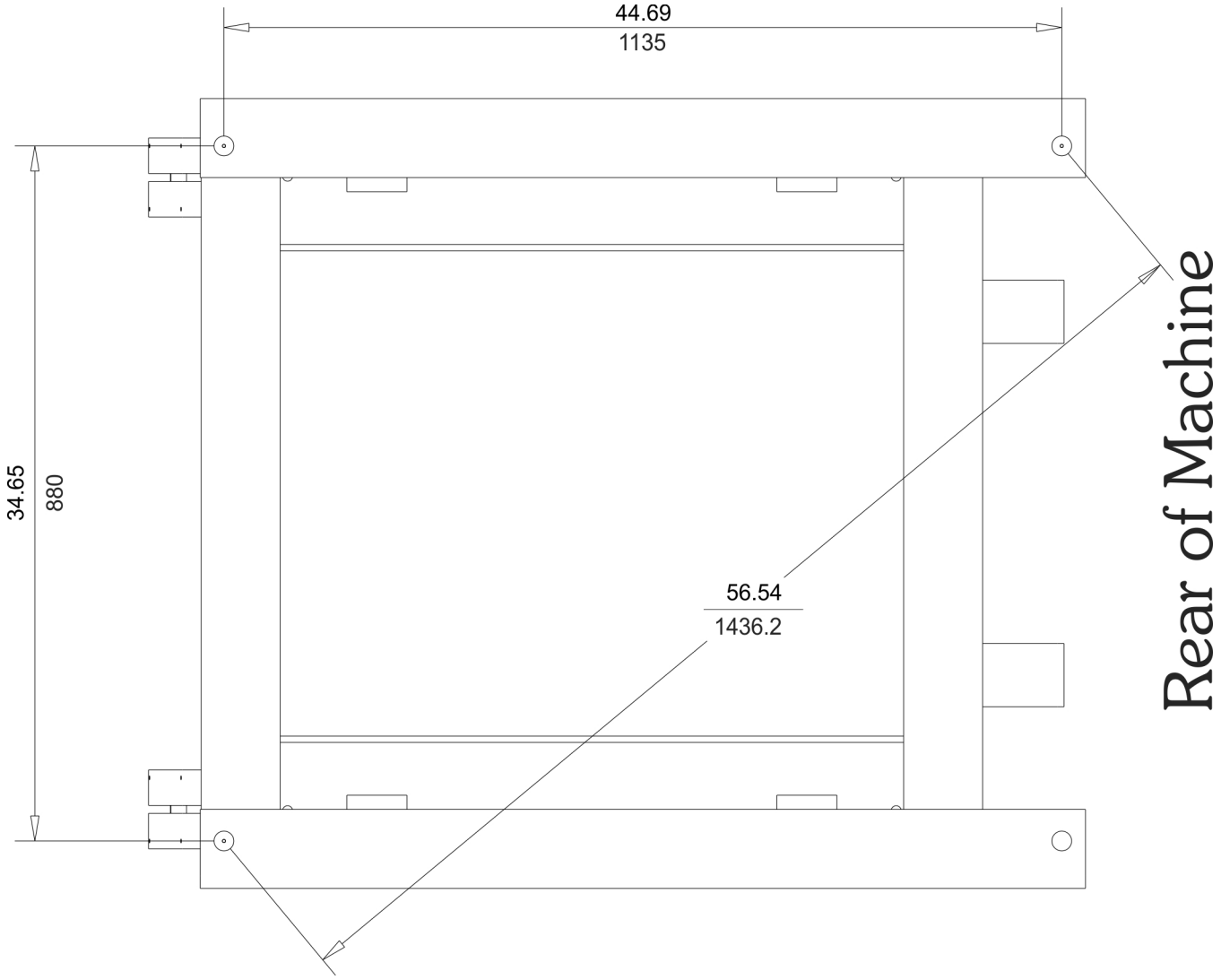

Figure 4.5: SP-75 Bolt Hole Layout

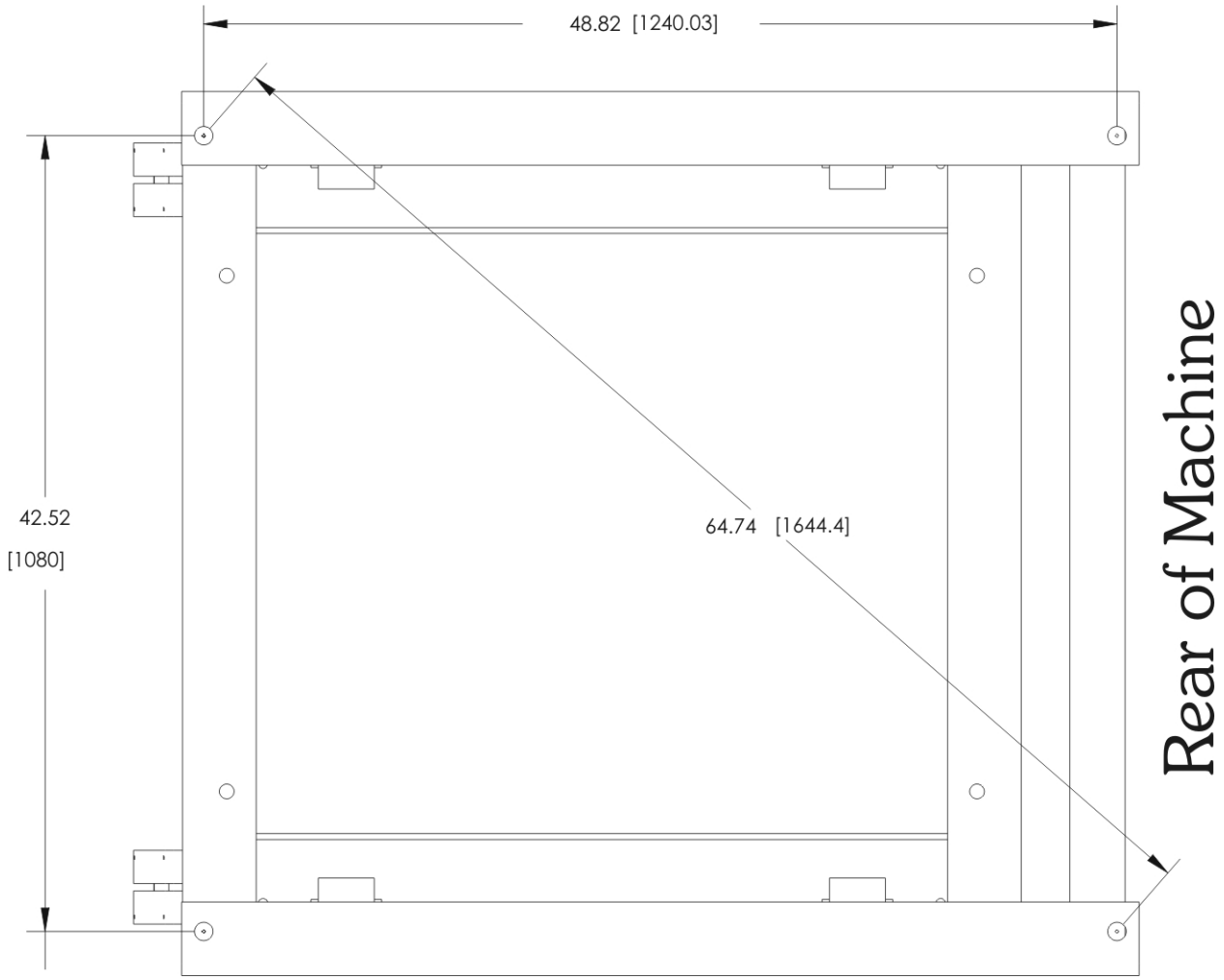

Figure 4.6: SP-100/110 Bolt Hole Layout

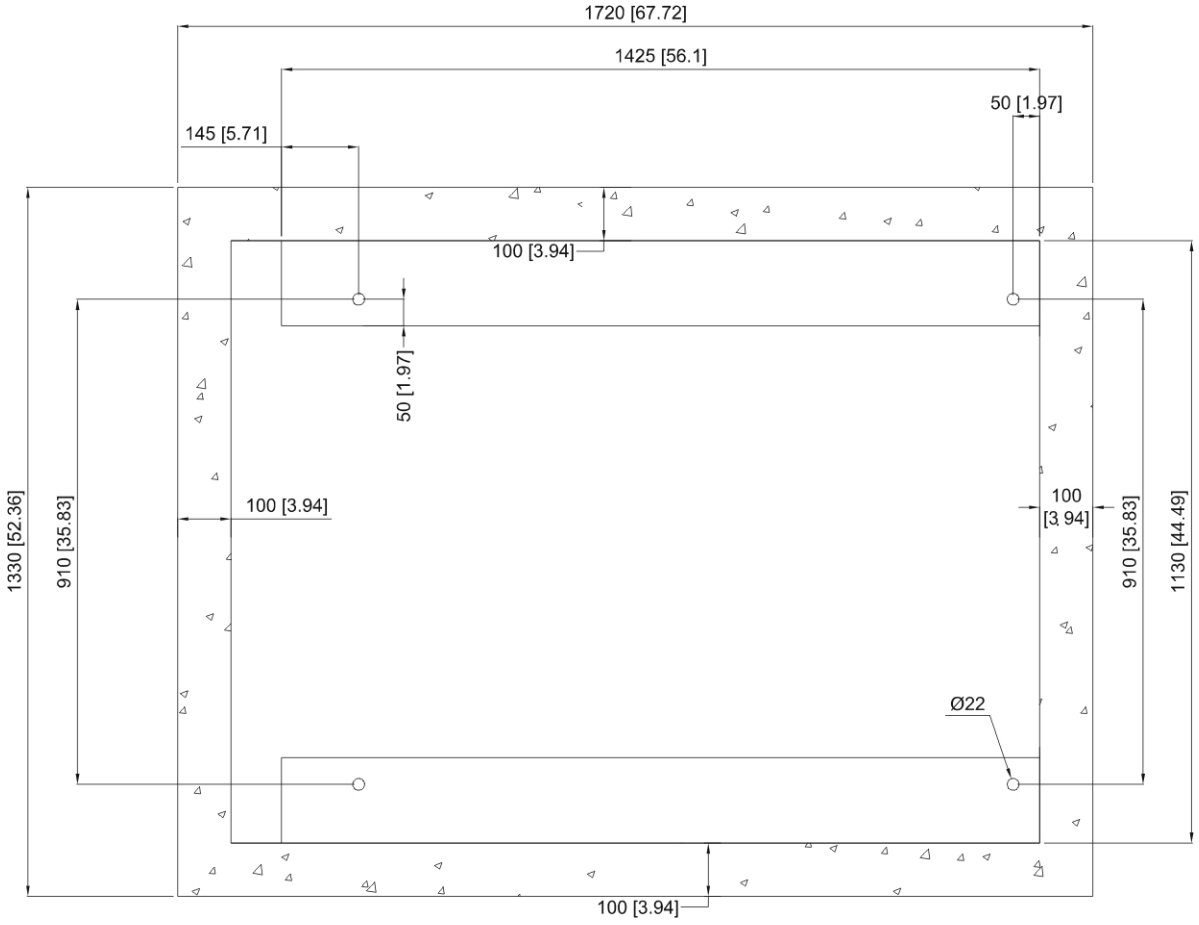

Figure 4.7: SP-130/135 Bolt Hole Layout

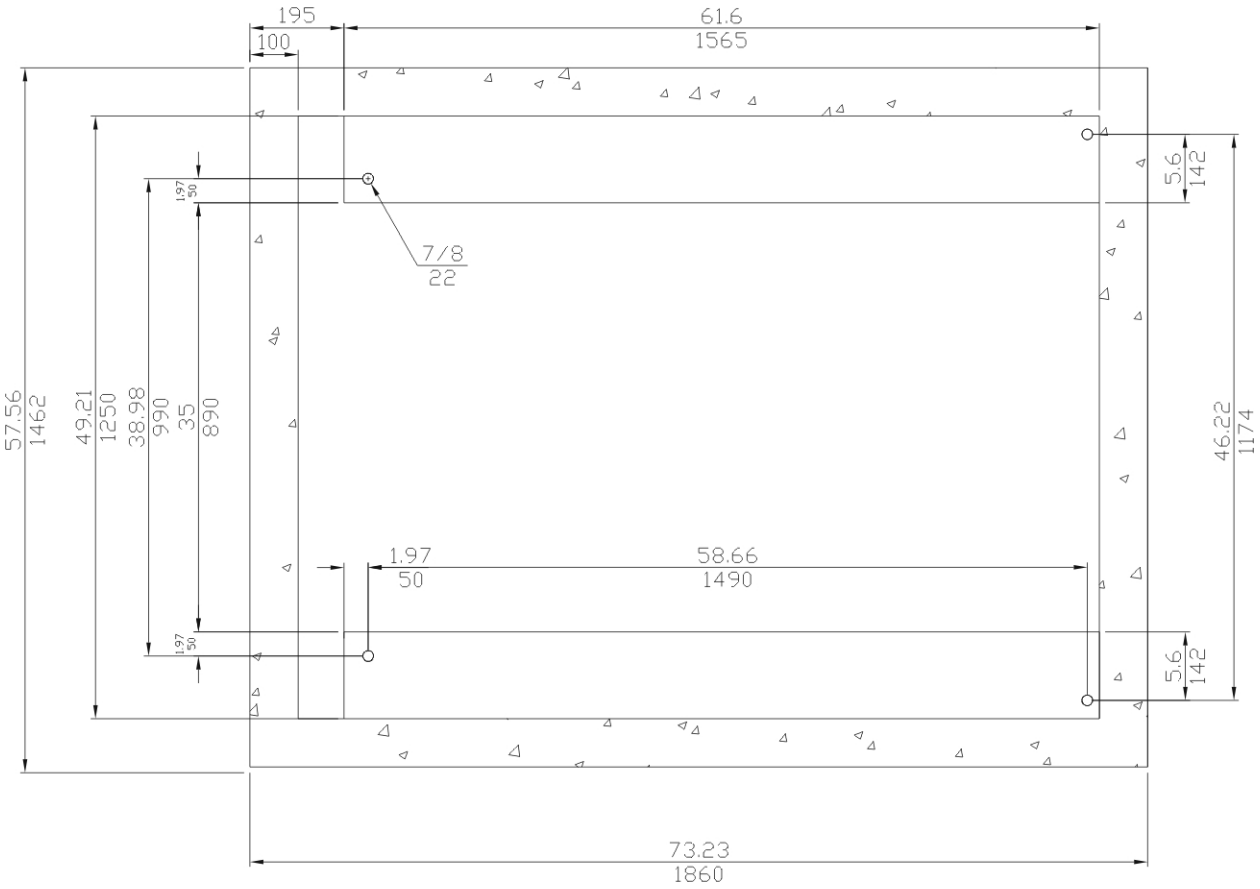

Figure 4.8: SP-155/165 Bolt Hole Layout

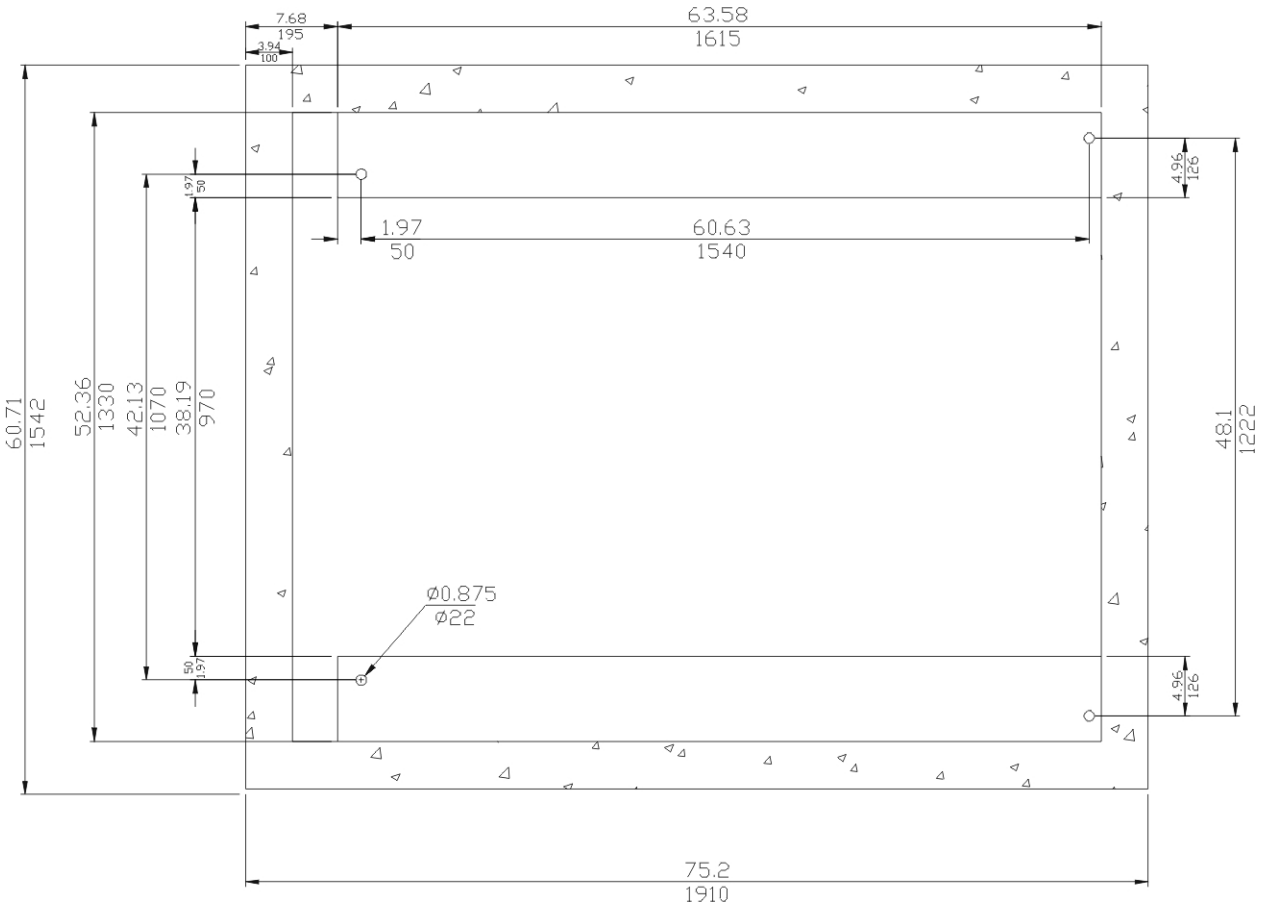

Figure 4.9: SP-185/195 Bolt Hole Layout

4.4.2 Mounting Bolt Location

All B&C washer-extractors should be secured by the use of machinery anchor bolts. High strength machinery anchors should be embedded in 3500 psi (24000 N/m2) reinforced concrete. For detailed information regarding the machine anchor bolt, see the instructions included with the anchor bolts themselves. The information provided is just an example. Ensure that the concrete is fully cured before proceeding.

Place the machine adjacent to the foundation. Do not attempt to move it by pushing on the sides.

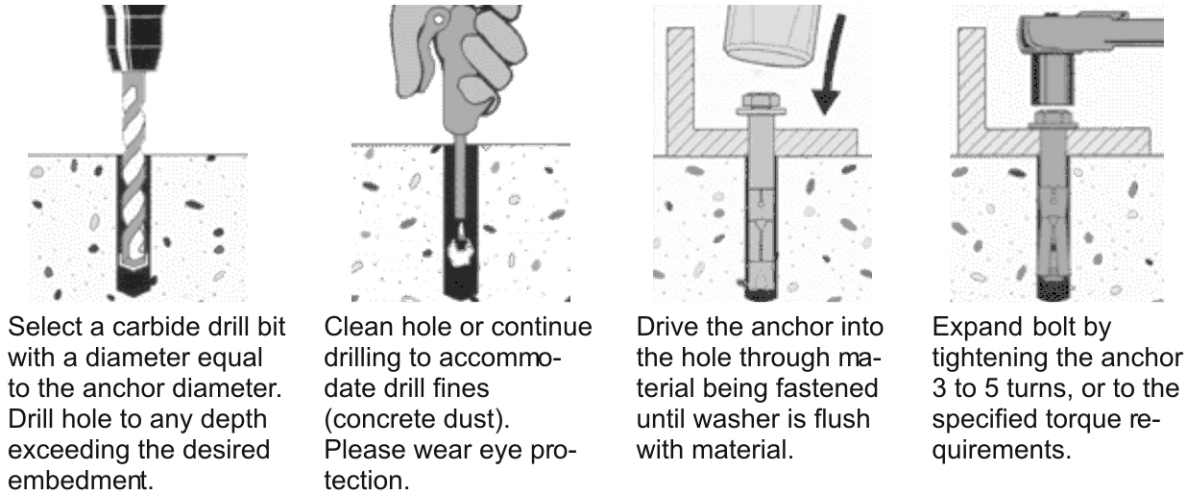
Select a carbide drill bit with a diameter equal to the anchor diameter. Drill hole to any depth exceeding the desired embedment.
Clean hole or continue drilling to accommodate drill fines (concrete dust). Please wear eye protection.
Drive the anchor into the hole through material being fastened until washer is flush with material.
Expand bolt by tightening the anchor 3 to 5 turns, or to the specified torque requirements.

Figure 4.10: Typical Machinery Anchor Installation

1. Remove the wood skid by unscrewing the carriage bolts holding it to the bottom frame of the machine.
2. Carefully place the machine over the anchor bolts. Raise and level it 1/2 inch above the floor on four points, using spacers that can be removed.
3. Fill the spaces between the machine base and floor with machinery grout. Grout completely under all frame members. Remove front panel and rear panel to gain access to all frame members. Force grout under the machine base until all voids are filled.
4. Remove the spacers carefully, allowing the machine to settle into the wet grout.
5. Attached the mounting bolt washers and lock nuts to the anchor bolts after the grout has hardened. Tighten the lock nuts by even increments-one after the other-until all are tightened evenly and the machine is fastened securely to the floor. The nuts should be tightened in a diagonal fashion, which will help ensure equal tension at all anchor points.
6. **Remove the transportation brackets which secure the moving components of the machine during shipping.** Refer to figure 4.11 on page 29 for typical locations.

4.5 Transportation Brackets

Remove both front and rear transportation brackets, as well as the bracket located on the lower inside right of the machine. Failure to remove shipping brackets before operation of the SP series will void your warranty. Inspect the machine carefully to ensure that all transportation brackets are removed. All transportation brackets are painted red for easy identification.

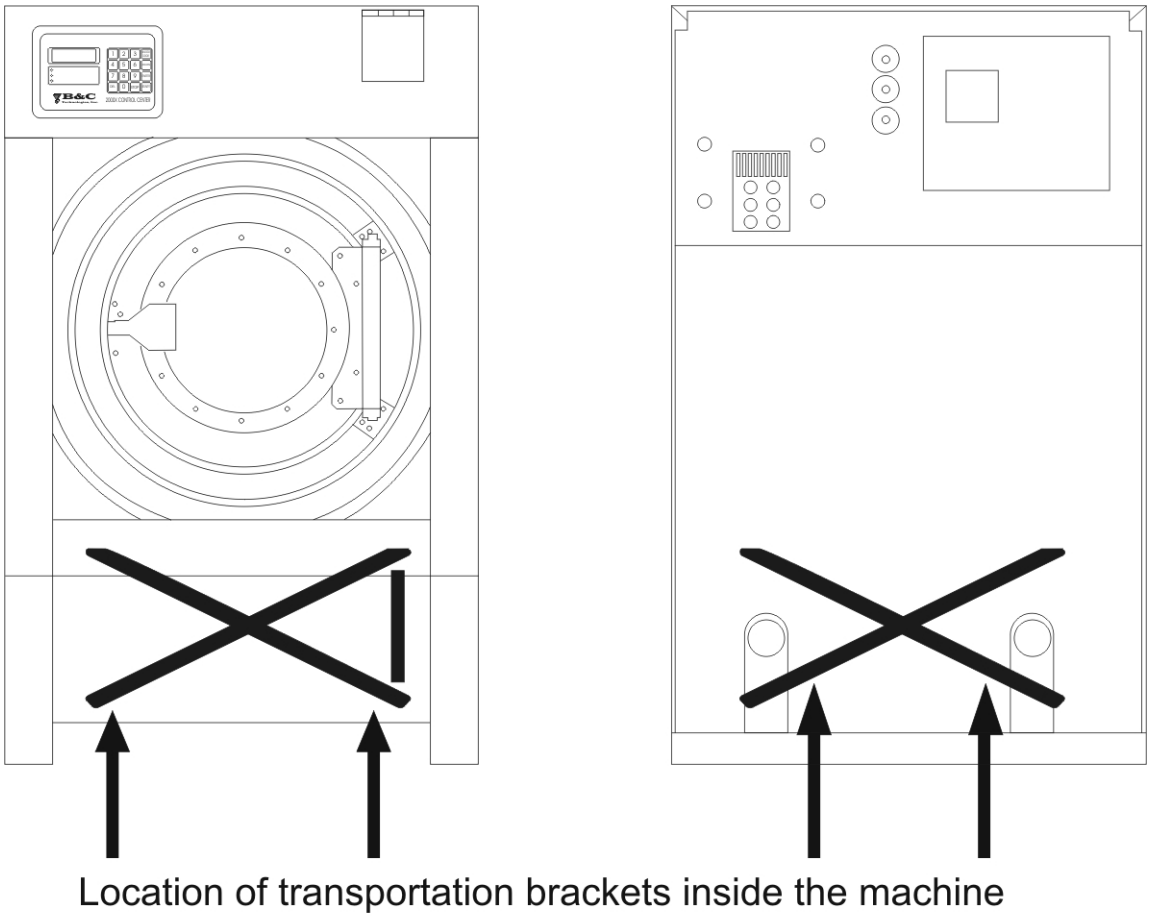

Figure 4.11: Typical Machinery Transportation Bracket Location

4.6 Drain Installation

A drain system of adequate capacity is essential to the machine performance. Ideally the water should empty through a 4 inch vented pipe directly into a sump or floor drain. See figure 4.12 on 30.

A flexible connection must be made to a vented drain system to prevent an airlock or siphon effect. If proper drain size is not available or practical, a surge tank is required. A surge tank in conjunction with a sump pump should be used when gravity drainage is not possible, such as in below-ground-level installations.

Before any deviation from specified installation procedures is attempted, the customer or installer should contact the manufacturer. Increasing the drain hose length, installing elbows, or causing bends will decrease drain flow rate and increase drain time, impairing machine performance. If the drain arrangement is inadequate, the machine will not extract and will not discharge water properly.

Drain Sizing

	Units		SP Series			
	Metric	US	SP-40 to 110		SP-130 to 195	
Drain connection Size	mm	in	76	3	102	4
Drain flow capacity	liters/min	gpm	581	150	560	150
Recommended Pit Size	liters	gal	388	100	850	225

Drain Construction

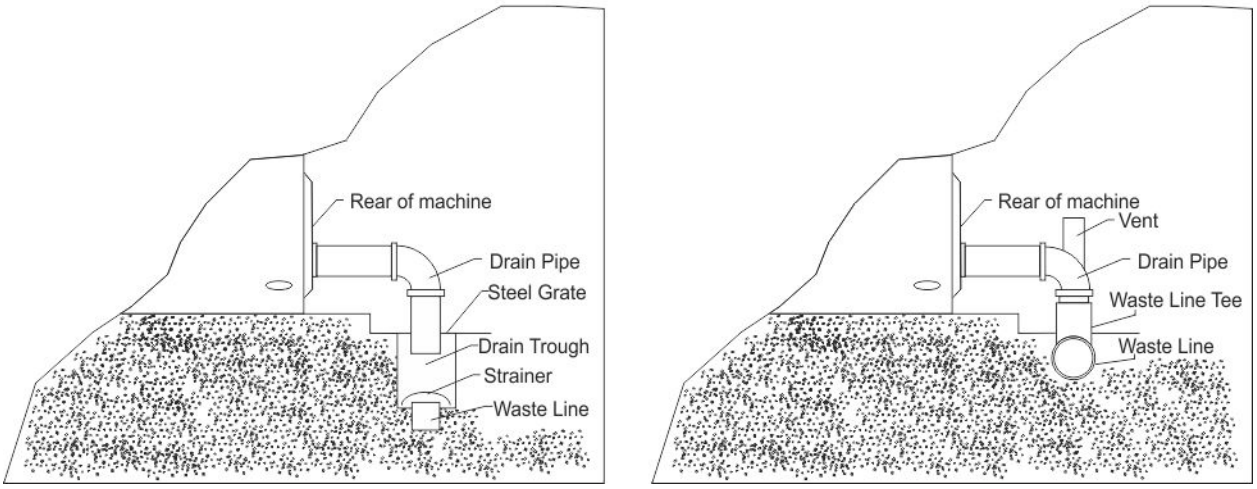

Figure 4.12: Drain System Information

This machine must be installed, adjusted, and serviced by a qualified electrical maintenance personnel familiar with the construction and operation of this type of machinery. They must also be familiar with the potential hazards involved. If this warning is not observed, personal injury or equipment damage resulting in voiding the warranty may result.

4.7 Electrical Installation

The AC drive requires a clean power supply free from voltage spikes and surges. A voltage monitor should be used to check incoming power. The customers local power company may provide such a monitor.

The AC drive provides for an internal circuit breaker. A separate circuit breaker governs the control circuit.

If input voltage measures above 230V for a 200V class drive or above 460V for a 400V class drive, either ask the power company if their representative can lower the voltage or install a bucking transformer kit available from the manufacturer. Voltages above 250V and 490V require additional measures. Contact the distributor or the manufacturer for assistance.

Note: For single phase operation (up to SP-110 only), connect input power to R and S, leaving the T terminal open.

Note: Do not use phase adders (roto-phase) on inverter driven equipment!

If controlling the AC drive with a parameter unit, the machines computer and its safety features are bypassed. This could allow the basket to rotate at high speeds with the door open. When using a parameter unit to control the AC drive, a large sign should be placed on the front of the machine warning people of the imminent danger.

Never touch terminals or components of the AC drive unless power is disconnected and the "'CHARGE"' indicator LED is off. The AC drive retains potential deadly voltage for some time after the power is disconnected. There are no user-serviceable parts inside the AC drive. Tampering with the drive will void the warranty.

Dangerous voltage are present in the electrical control boxes and at the motor terminals. Only qualified personnel familiar with electrical test procedures, test equipment, and safety precautions should attempt adjustments and troubleshooting. Disconnect power from the machine before removing the control box cover, and before attempting any service procedures.

Table 4.2: 200V Electrical Service Requirements

	200-230V, 1 PH			**200-230V, 3 PH**		
Machine	**Max Amps**	**Breaker**	**Wire Size**	**Max Amps**	**Breaker**	**Wire Size**
SP-40 / 45	8	15	14ga / 1.6mm	5	15	14ga / 1.6mm
SP-50	11	15	14ga / 1.6mm	6	15	14ga / 1.6mm
SP-60 / 65	14	15	14ga / 1.6mm	8	15	14ga / 1.6mm
SP-75	14	15	14ga / 1.6mm	9	15	14ga / 1.6mm
SP-100 / 110	31	40	10ga / 2.5mm	18	20	14ga / 1.6mm
SP-130 / 135	**N/A**			26	30	10ga / 2.5mm
SP-155 / 165	**N/A**			32	40	10ga / 2.5mm
SP-185 / 195	**N/A**			58	60	6ga / 4mm

Table 4.3: 400V Electrical Service Requirements

	380-460V		
Machine	**Max Amps**	**Breaker**	**Wire Size**
SP-40 / 45	3	15	14ga / 1.6mm
SP-50	5	15	14ga / 1.6mm
SP-60 / 65	4	15	14ga / 1.6mm
SP-75	5	15	14ga / 1.6mm
SP-100 / 110	9	15	14ga / 1.6mm
SP-130 / 135	13	15	14ga / 1.6mm
SP-155 / 165	16	25	14ga / 1.6mm
SP-185 / 195	29	30	12ga / 2mm

Note: Wire sizes shown are for copper, THHN, 90 conductor per NEC article 310 (USA).

The machine should be connected to an individual branch circuit not shared with lighting or other equipment.

Because this is a vibrating machine, the use of SO cable or similar, with a twist-lock plug, to connect the machine to main power is recommended. A shielded liquid tight or approved flexible conduit with proper conductor of correct size installed in accordance with National Electric Code (USA) or other applicable codes is also acceptable. The connection must be made by a qualified electrician using the wiring diagram provided with the machine. See the Electrical Connection data Chart for correct wire sizes.

For personal safety and for proper operation, the machine must be grounded in accordance with state and local codes and in the USA in accordance with the National Electric Code, article 250-96. The ground connection must be to a proven earth ground, not to conduit or water pipes.

Do not connect the ground to the neutral (N) leg at the terminal strip (if so equipped).

If a DELTA supply system is used, the high leg should be connected to T, since control voltage is derived from R and S.

Insure that the control transformer taps are connected in accordance with the incoming line voltage. Verify connections as shown on the schematic with each machine.

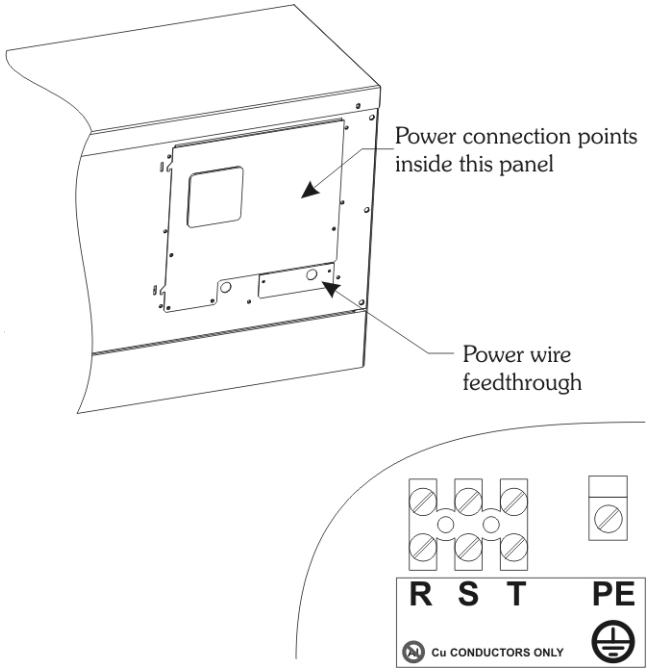

Figure 4.13: Electrical Service Connection Detail

4.8 Water Connection

Individual hot and cold plumbing lines with individual shut-off valves must be available to the machine. Hot water should be minimum of 160F (70C). If lower temperature water is used the machine can be equipped for steam heating to heat the wash solution to desired temperature. Best performance will be realized if water is provided at a pressure of 30-85 psi (2-7 Bar). Although the machine will function properly at lower pressures, increased fill times will occur. If the fill time exceeds 9 minutes, the EL6 control will display a WDT LEVEL EXP (watch dog timer) alarm, indicating that the machine did not fill quickly enough. This watch dog timer is programmable – see the EL6 Programming Manual, included with the machine, for further details.

Flush the water system for at least two minutes prior to initial use.

Use flexible hoses and install separate screen filters in the lines to keep rust and other foreign particles out of the solenoid valves. Hang the hoses in a large loop. Do not allow the hoses to kink. The water connections to the machine should be supplied by a hot and cold water line of least the sizes shown in table 4.14 on page 33. SP-185 should use the next larger size pipe. Refer to table 4.4, 4.5, and 4.6 on page 34 for details on individual machine requirements.

NUMBER OF MACHINES	Pipe Size SP Series	
	DN	Inch
1	25	1
2	25	1-1/4
3	40	1-1/2
4	40	1-1/2
5	50	2
6	50	2-1/2

Figure 4.14: Water Connection Detail

To avoid eventual water hammer in the water line, suitable devices to reduce the water hammer should be installed.

4.9 Steam Connection

For machines equipped with optional steam heat, install piping in accordance with approved commercial steam practices. Steam requirements are shown in the figure 4.7 on page 35. Failure to install a steam filter/trap may void the warranty.

Table 4.4: SP-40 thru SP-65 Water Requirements

Water						Flow Rate		Minimum Supply		Max Operating	
Connection Size		Line Pressure		Max Temp		(@45PSI/3Bar)		Line Size		Pressure	
US	Metric	PSI	Bar	F	C	gal/min	liter/min	US	Metric	US	Metric
3/4″	DN 19	30-75	2-5	200	93	11	40	3/4	DN 19	125 PSI	8 Bar

Table 4.5: SP-100 thru SP-165 Water Requirements

Water						Flow Rate		Minimum Supply		Max Operating	
Connection Size		Line Pressure		Max Temp		(@45PSI/3Bar)		Line Size		Pressure	
US	Metric	PSI	Bar	F	C	gal/min	liter/min	US	Metric	US	Metric
1″	DN 25	30-75	2-5	200	93	30	113	1-1/4	DN 32	125 PSI	8 Bar

Table 4.6: SP-185 thru SP-195 Water Requirements

Water						Flow Rate		Minimum Supply		Max Operating	
Connection Size		Line Pressure		Max Temp		(@45PSI/3Bar)		Line Size		Pressure	
US	Metric	PSI	Bar	F	C	gal/min	liter/min	US	Metric	US	Metric
1-1/4″	DN 32	30-75	2-5	200	93	37	140	1-1/2	DN 38	125 PSI	8 Bar

Never touch internal or external steam pipes, connections, or components. These surfaces can be extremely hot and will cause severe burns. The steam must be turned off and the pipe, connections, and components allowed to cool before the pipe can be touched.

STEAM INLET and CONSUMPTION:	UNITS		SP-40/45	
Steam inlet size	DN	in	13	1/2
Required steam to heat bath 10F (5.55C)LOW	kg	lbs	1.2	2.4
Required steam to heat bath 10F (5.55C)HIGH	kg	lbs	1.4	3.1
Average Steam consumption per cycle	kg	lbs	23	50.6

STEAM INLET and CONSUMPTION:	UNITS		SP-60/65/75	
Steam inlet size	DN	in	13	1/2
Required steam to heat bath 10F (5.55C)LOW	kg	lbs	1.5	3.2
Required steam to heat bath 10F (5.55C)HIGH	kg	lbs	1.8	4
Average Steam consumption per cycle	kg	lbs	31	66

STEAM INLET and CONSUMPTION:	UNITS		SP-100/110	
Steam inlet size	DN	in	20	3/4
Required steam to heat bath 10F (5.55C)LOW	kg	lbs	2.5	5.5
Required steam to heat bath 10F (5.55C)HIGH	kg	lbs	3.4	7.4
Average Steam consumption per cycle	kg	lbs	60	132

STEAM INLET and CONSUMPTION:	Units		SP-130/135	
Steam inlet size	DN	in	25	1
Required steam to heat bath 10F (5.55C)LOW	kg	lbs	3.1	6.8
Required steam to heat bath 10F (5.55C)HIGH	kg	lbs	4.4	9.6
Average Steam consumption per cycle	kg	lbs	74	163

STEAM INLET and CONSUMPTION:	Units		SP-155/165	
Steam inlet size	DN	in	25	1
Required steam to heat bath 10F (5.55C)LOW	kg	lbs	3.8	8.4
Required steam to heat bath 10F (5.55C)HIGH	kg	lbs	5.8	12.76
Average Steam consumption per cycle	kg	lbs	88	194

STEAM INLET and CONSUMPTION:	Units		SP-185/195	
Steam inlet size	DN	in	25	1
Required steam to heat bath 10F (5.55C)LOW	kg	lbs	5	11
Required steam to heat bath 10F (5.55C)HIGH	kg	lbs	7.7	16.9
Average Steam consumption per cycle	kg	lbs	117	194

Table 4.7: Steam Service Connection Detail

4.10 Compressed Air Connection

SP-130/135, SP-155/165, SP-185/195 only

SP-110 and smaller do not require compressed air. Best performance will be realized if air is provided at a pressure of 80-100psi (5.4-6.7 bar). SP-130 and larger machines will experience door seal and drain failure if compressed air service is interrupted. Ensure the provided air is filtered and dry. Wet and/or dirty air will cause rapid deterioration of internal components and void your warranty on these parts. Install a compressed air dryer to prevent water build up in the airlines. Make sure to use best practice when installing air lines so that water does not damage internal air components - the machine should not be the low point in the air path. Install an inline air filter on each machine to reduce contamination (B&C part number 270-324 or purchase locally). Refer to figure 4.15 on page 36.

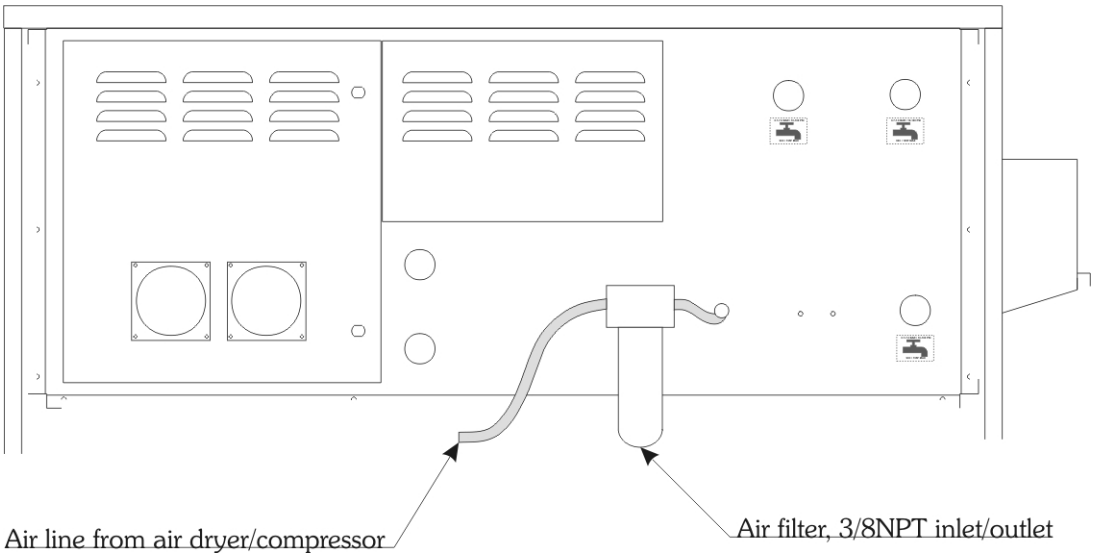

Figure 4.15: Compressed Air Connection Detail

4.11 External Chemical Supplies

The following procedures must be observed when connecting any chemical injector to the washer-extractor. See figure 4.16 on 37 for a typical supply injection system setup.

Wear Eye and hand protection when handling chemicals. Always avoid direct contact with raw chemicals. Read the manufacturers directions for accidental contact before handling chemicals. Ensure that an eye-rinse facility and an emergency shower are within easy reach. Check at regular intervals for chemical leaks.

Undiluted chemicals dripping can damage the machine. **Therefore, all chemical supply dispenser pumps should be mounted below the washers injection point.** All dispenser tubing should also run below the injection point. Loops do not prevent drips if these instructions are not followed. Failure to follow these instructions could damage the machine and void the warranty.

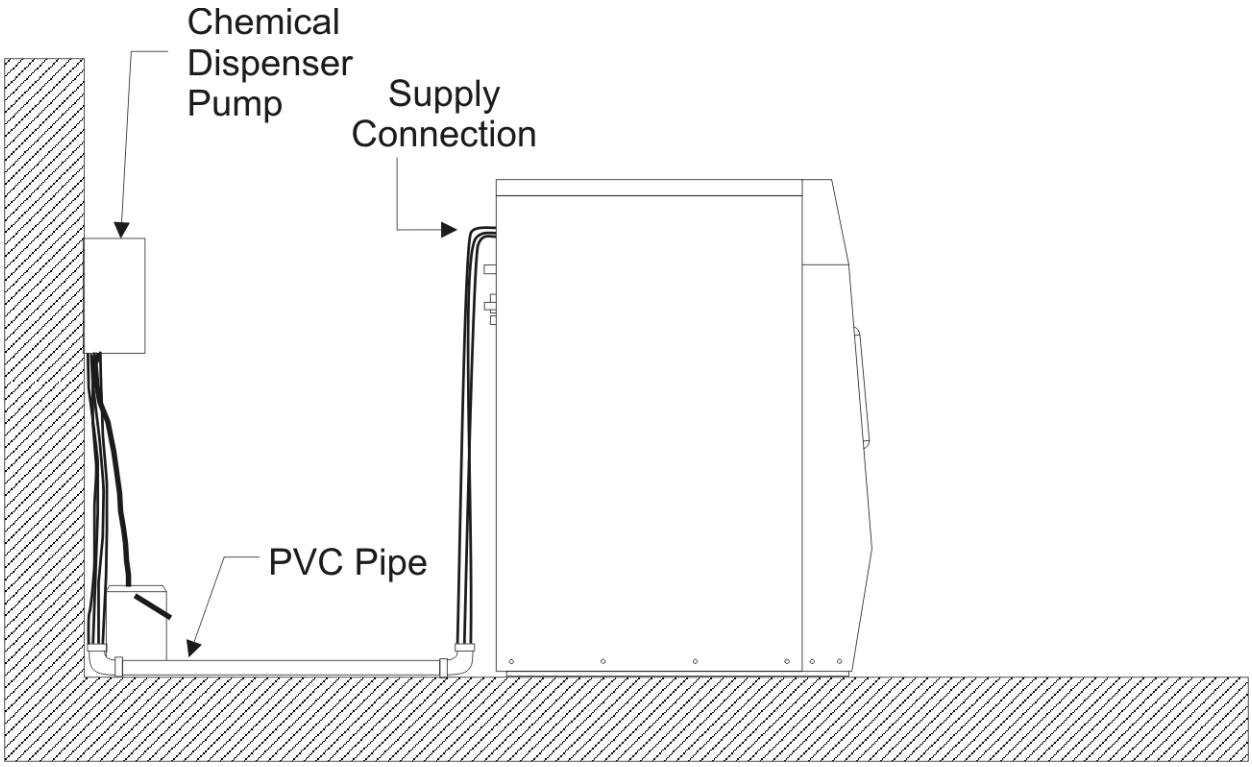

Figure 4.16: External Chemical Supply Connection Detail

4.11.1 Chemical Connection

The supply compartment on the B&C SP models is located on the front of the machine. Supply cups can be accessed by opening the dispenser lid. The supply cups can be removed and filled as desired. Supply compartments are numbered 1,2,3,4 and 5 from the left of the machine to the right for the optional 5 cup system.

The standard single cup supply will flush when Detergent 1 is programmed in the EL6. The optional five cup supply dispenser will flush each cup when Detergent 1 through Detergent 5 is programmed. The programmed chemical signal also appears as a 24VAC signal at the external chemical terminal strip for the duration of each programmed signal.

External supply connections for the B&C SP washer-extractors with the Stainless Steel supply box are located on rear of the machine at the vacuum breaker. Hose connections should be made via the threaded connectors. See figure 4.17 on page 39.

1. Remove plugs from base. See figure.

2. Install the supplied chemical nipple, using teflon tape.
3. Insert tubes onto the nipples, using small hose clamps or wire ties to prevent the hose from slipping off.

The chemical flush water valve (relay 12) should be used with each chemical signal (see the EL6 programming manual for details).

For the poly supply box, you must drill the nipples prior to use (max 1/4 bit). A NPT connection is also provided for flushing systems. The chemical flush valve is not necessary. See figure 4.18 on page 39.

4.11.2 Chemical Signal Connections

Connection terminals are located in the rear control box for output signals to the chemicals injection supply pump. Refer to figure 4.19 on page 40.

Terminals SUPPLY 1 through SUPPLY 8 provide signals for external chemical supply pumps. The signal is a maximum of 1 amp at 24V 50/60Hz.

Do not attempt to increase circuit breaker rating as this will cause damage to the washer-extractor circuitry and void the warranty.

Any injection system pump, which requires 24-220V AC must be powered by a separate external power source.

4.12 Control Function Test

The machine should be cleaned after the installation is complete. A function test should then be executed on the unloaded machine as follows:

1. Check the proper supply for such characteristics as correct voltage, phase, and cycles to be certain they are correct for the machine.
2. Open manual shut-off water valves to the machine.
3. Press Emergency Stop button.
4. Apply power to the machine.
5. Release the Emergency button.
6. Check the door interlock before starting the machine.

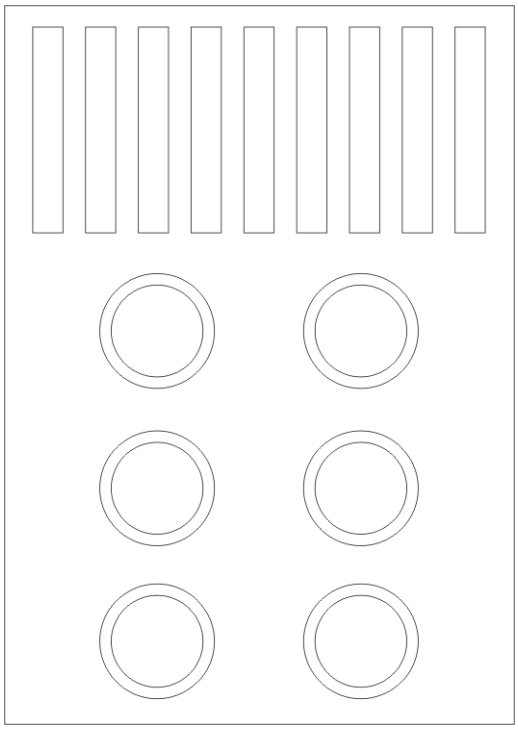

Figure 4.17: Stainless Steel Vacuum Breaker / Supply Box

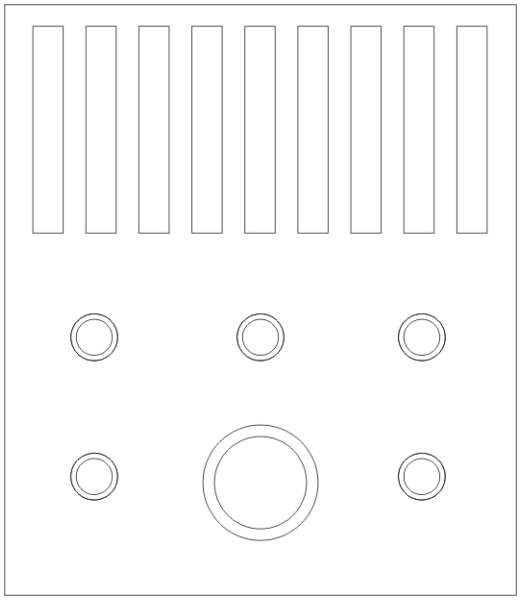

Figure 4.18: Poly Vacuum Breaker / Supply Box

(a) Attempt to start the machine with the door open. The machine should not start with the door open.

(b) Close the door without locking it and attempt to start the machine. The washer should not start with the door unlocked.

(c) Close and lock the door and start a cycle. Attempt to open the door while the cycle is in progress. The door should not open. If the door lock and interlock are not functioning properly, call a service technician.

Attempting to obtain power from the machine terminals may damage the machine circuit and/or the chemical injection system. Consult the chemical injection supply system instructions for operational details.

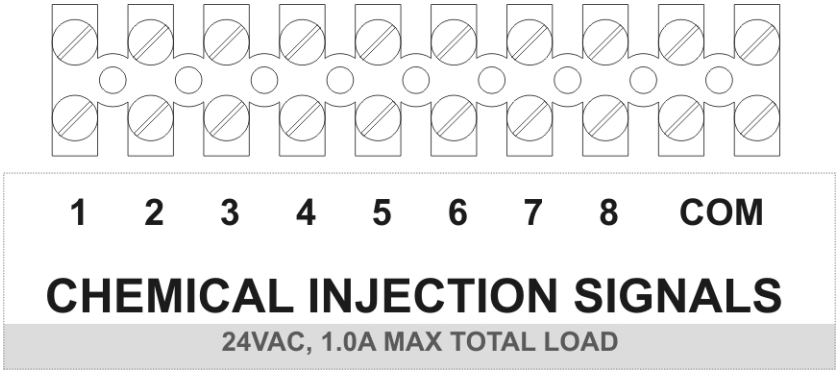

Figure 4.19: External Chemical Supply Terminal Block Detail

7. For testing, select program 30 by pressing key 3 and key 0 on the keypad. Then press ENTER followed by the START key. Run the complete program, checking operation of water inlet valves, drain, and extract functions. Program 30 is a test program that goes through most machine functions. Please note that the Spin 99 routine is **designed to fail balance**. Simply advance the program to the Spin 3 cycle after balance fails (use the appropriately named ADVANCE key). Refer to the EL6 Stock Program Listing that came with the machine for further details on the test program.

8. Cylinder rotation must be counter-clockwise in the extract step. If rotation is not correct, disconnect the power to the machine. A qualified technician must reverse any two leads between the AC drive and the motor. See figure 4.20 on page 40.

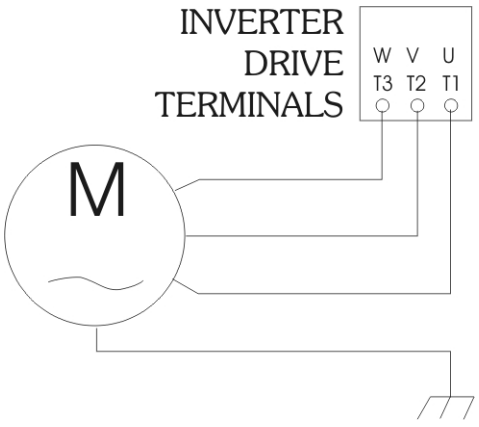

Figure 4.20: Inverter Drive to Motor Detail

Chapter 5

Operation

5.1 Door Lock Operation

The lock system uses a "'push-to-open / push-to-close"' style mechanism which differentiates it from any other door lock in the industry. This design was developed as a result of analyzing the shortcomings of other door lock mechanisms on the market. It hence has many fundamental safety and mechanical advantages.

5.1.1 Opening and Closing the Door

SP-110 and smaller

To open the door the machine must not be running a wash program – "'Program n."' should be displayed on the EL6 or "'ENTER PROG"' on the FM7. Simply push and release the door handle with the palm of your hand. As you push the handle in the door lock solenoid will energize and the pin will retract and release the door. Then as you release the pressure on the handle the door will be free and you can pull it open. To close the door swing it closed, then push the handle firmly until you hear the solenoid engage, releasing the door lock pin to lock the door. When you start a wash program the door lock is securely disabled so that the door cannot be accidentally opened.

SP-130 and larger

To open the door the machine must not be running a wash program – "'Program n."' should be displayed on the EL6 or "'ENTER PROG"' on the FM7. Press the door open button which activates the door lock air cylinder. This will allow the pin to retract and release the door. Now rotate the door lock bar counter-clockwise and the door can pulled open. To close the door, press the door open button, swing the door closed, then rotate the door lock bar clockwise fully. Release the door lock button allowing the door lock pin to lock the door. When you start a wash program the door lock is securely disabled so that the door cannot be accidentally opened.

5.1.2 Periodic Maintenance

- The door should be tested every day for safe operation by trying to start a program with the door open. If the machine will begin operation in this state it should immediately be removed from service, locked out, and a qualified service technician called to repair it.
- If the door lock is malfunctioning in any way, the machine should immediately be removed from service, locked out, and a qualified service technician called to repair it.
- The door lock pin and handle hinge should be lubricated with "'silicon spray lube"' monthly. This product is available at almost any auto parts store. This procedure does not require any disassembly.
- The door handle nose bushing should be checked for wear and cracking monthly. It should be replaced when it is cracked, missing, or worn out.
- The door lock tongue and lock pin alignment should be checked monthly and adjusted as needed.
- For detailed instructions on door alignment, request TSB009 when contacting technical service.

5.2 Machine Loading

Proper loading of your SP series washer-extractor is a great factor in determining both the performance and longevity of your investment. Small loads are wasteful on many levels:

1. Small loads waste water, chemicals, electricity, and most expensively, time. Running your machine at lower than its rated capacity costs you time and money.
2. Small loads cause more wear and tear on the machine. Small loads are very difficult to balance properly, and will cause excessive vibration during extract. These vibrations mean that bearing loads are higher, reducing the life of the main bearings. The extra vibrations also tend to cause other fasteners on the machine to loosen over time, causing premature wearing and more frequent service.
3. Smaller loads are not easier for the machine to handle - quite the opposite, they are more difficult on the entire machine. When the machine is under loaded, it causes greater stress on the inverter drive, belts, and motor, leading to reduced life of these expensive components.

Refer to table 5.1 on page 43 for proper loading weights.

If a scale isnt available, fill the machine up with goods to be laundered. Do not attempt to "'stuff"' the machine full, but ensure that there is no gap at the top of the cylinder.

Dry Weight Capacity		
Model	**Capacity**	
SP-40	40 lbs	18 kg
SP-45	45 lbs	21 kg
SP-50	50 lbs	23 kg
SP-60	60 lbs	27 kg
SP-65	65 lbs	30 kg
SP-100	100 lbs	45 kg
SP-110	110 lsb	50 kg
SP-130	130 lbs	59 kg
SP-135	135 lbs	61 kg
SP-155	155 lbs	71 kg
SP-165	165 lbs	75 kg
SP-185	185 lbs	84 kg
SP-195	195 lbs	89 kg

Table 5.1: Proper Load Sizing

5.3 Wash Program Execution

After power is applied to the machine, and the internal diagnostics are complete, the machine is ready for a program to be chosen. The EL6 display will show:

PROGRAM N._

The FM7 display will show:

ENTER PROG_

Using the keypad, type the number of the program you wish to run followed by the ENTER key. Standard programs are outlined in the EL6 stock program list, included with the machine. The display will change to show the fist cycle of the selected program:

PRWH1 EXECUT.?

press START to execute the program, or RESET to return to program selection. While the program is executing, the display shows the current segment of the program, and the ending condition of the segment. See the following examples:

5.3.1 End Step Condition: Level

If the end requirement of the segment (step) is a particular water level, the display will show:

RINSE1 LVL=cm12

cm12 is the actual water level in the machine (12 centimeters). Pressing the LEVEL key shows, for

3 seconds, the required value to advance. If INC or DEC is pressed, you can temporarily modify the value for the current step. Pressing TEMP allows you to see the current temperature of the water. Pressing the TIME key shows the watch dog timer (WDT) value for the current step.

5.3.2 End Step Condition: Temperature

If the end condition of the segment is a temperature, the display will show:

WASH3 TEMP=35C

where 35C is the actual temperature of the wash solution. By pressing TEMP the display will change, for 3 seconds, show the required step temperature for advance. Pressing INC or DEC allows modification of the value for the step. Pressing LEVEL allows you to see the current water level. Pressing the TIME key shows the watch dog timer (WDT) value for the current step.

5.3.3 End Step Condition: Time

If the end of the step calls for a time to elapse, the display shows:

RINSE1 T=2m 30s

In this case, the display shows the time left in the step. INC and DEC allow you to add or subtract minutes for the current cycle. TEMP allows you to view the current water temperature, and LEVEL shows the current water level. Note: During heating, fill and drain phases, the WDT (watch dog timer) is activated. If the phase does not complete before the timer expires, an alarm will be displayed indicating that the particular phase did not complete within the time allowed.

5.3.4 Single Step Execution

A single step or cycle of a wash program can be executed. At the main prompt, enter zero for the program number. For two seconds, the display changes to:

SINGLE CYCLE

Then quickly to:

PREWASH=?

Now, using the INC and DEC keys, you may choose the cycle you wish to run (PREWASH, WASH, RINSE, SPIN, UNROLL). When you have selected the cycle type, press ENTER and select the cycle number. Confirm by pressing ENTER. The display changes to:

PRWH1 EXECUT.?

Pressing the START key will execute the cycle you chose (Prewash1 in this example).

5.3.5 Partial Program

A program can be started from the beginning, or at any subsequent cycle. After selecting the program you wish to execute, the display will show:

PRWH1 EXECUT.?

Instead of pressing START to execute the program, press the ADVANCE key. The cycles within the program will be displayed incrementally. Choose the point at which you would like to begin, and press the START key. The machine will begin operation from this point.

5.3.6 Displaying the Current Program and Step

While the machine is in operation, pressing then ENTER key will cause the display to show the current program number and step.

PRG 1 STP 3

5.3.7 Soak

You can insert a pause at any point of the wash program with the exception of distribution and spin. To do so, simply press the PAUSE key. The display will begin showing a time, counting up as long as the machine remains paused. Pressing the START key will restart the program at the point it was paused. As long as the machine is paused, all other WDT (watch dog timers) are paused as well.

5.3.8 Advance

While any program is running, you can end the current step and advance to the next one by pressing the ADVAN key. If the key is pressed during a spin, the spin will be aborted, and the standard spin slow down time will be activated. It is possible to disable the advance function.

5.3.9 Halting a Program

At any time during the execution of the wash program, the running program can be terminated by pressing the STOP key.

5.3.10 Water Level Refresh

While a program is running, if the water level drops to a level which is 3cm below the target level, cold water will automatically be added to replenish the level.

5.3.11 Unbalance

If the load is excessively out of balance, the spin routine will stop and a redistribution of the goods will take place. If three consecutive out of balances occur, the control will end the current program. After the first unbalance, the balance indicator will light on the EL6 control panel and remain illuminated until a new program is started. The balance indicator light does not necessarily indicate a problem, but that one or more retries was required. The FM7 has no indicator.

5.3.12 Power Failure

If the power fails during execution of a program, and is of less than one second, it is ignored. If the failure is longer than one second, the machine stops. Upon restoration of mains power, the display shows CYCLE CONTINUE? and the power failure indicator illuminates on the front panel (EL6 only - FM7 has no indicator). If you wish to restart the program at the point in which power failed, press the START key. At this point, the program restarts at the point of power failure and the power failure indicator turns off. If you wish to cancel the program, simply press the RESET key. This function is not active while a single cycle is running.

5.3.13 End of Program

When a program has completed, the message PLEASE WAIT is displayed and the buzzer sounds. The buzzer can be silenced by pressing the RESET key. If the temperature or water level are out of bounds, the display shows the offending value and the door cannot be opened.

5.3.14 Malfunction Alarms

The state of the water temperature and water levels are constantly monitored to prevent functioning problems with these devices. Watch Dog Timers (WDT) are used to prevent cycle failure when temperatures, fills, drains, and levels dont meet programmed values. In the event of a program fault, the buzzer sounds and the display changes to show the fault:

LEVEL FAULT

Indicates a problem with the level sensing system. This could be a loose or cracked water level tube, the level sensor, or the level sensing circuit. As long as the system detects a problem with the level sensing system, the machine will be inoperable. The buzzer can be disabled with the RESET. Refer to the EL6 Manual for possible remedies.

TEMP FAULT

Indicates a problem with the temperature sensing circuitry, temperature probe, or wiring. The machine continues to function, although auxiliary heating (if equipped) is disabled. The Temperature fault indicator on the control panel will be illuminated (EL6 only - FM7 has no indicator).

WDT TEMP EXP

Indicates the programmed temperature was not reached within the allotted time. The most common cause is a malfunctioning auxiliary heating system. A short WDT time and very cold water can also cause this problem. Pressing the START key will cancel the alarm and allow the program to continue.

WDT LEVEL EXP

eached within the allotted time. The most common causes:

During Fill

- Faulty water inlet valve
- Low or no water pressure
- Faulty drain valve
- Problem with water level tube

Pressing START will continue the program, while RESET will cancel the program.

During Drain

- Drain valve blocked
- Drain hose blocked
- Faulty Drain Valve

Pressing START will continue the program, while RESET to end the program.

OVERLOAD!

Not normally used on the SP Series. Indicates an electrical problem on the EL6 i/o board. Contact a qualified service technician.

OPEN DOOR

Indicates the door is not closed properly. This fault disables the machine until cleared, and aborts a program if active. Press RESET to clear the fault.

LEVEL=cm4

Indicates a water level of greater than 2cm a the onset of spin or at cycle end. The machine will resume the spin or unlock the door when the level falls below the threshold. Press RESET to abort the cycle. Can also indicate a problem with the EL6 water level system. See the EL6 manual for additional remedies.

5.3.15 Maintenance Alarm

After 450 wash programs have completed, the control will call for maintenance:

MAINTENANCE

The message appears at the start of a program, and is repeated at the beginning of each wash program until reset (see function 217 in the EL6/FM7 Programming and Operation Manual for full details). Before resetting the alarm, **PERFORM ROUTINE MAINTENANCE AS OUTLINED ELSEWHERE IN THIS MANUAL.**

For further information regarding access functions and programming, see the EL6/FM7 Computer Programming and Operating Instructions manual, included with the machine or from the B&C Technologies website: www.bandctech.com.

Chapter 6

Maintenance

Routine maintenance maximizes operating efficiency and minimizes downtime. The maintenance procedures described below will prolong the life of the machine and help prevent accidents. Daily, weekly, monthly, and quarterly checklist are provided at the end of this section. Laminate the checklists to preserve them for repeated copying. Operators and technicians are encouraged to add checks specific to their machines particular application. When possible, space is provided on the checklists for this purpose.

The following maintenance procedures must be performed regularly at the required intervals.

6.1 Daily

6.1.1 Beginning of Day

1. Inspect water inlet valve hose connections on the back of the machine for leaks.
2. Inspect steam hose connections for leaks, where applicable.
3. Verify that insulation is intact on all external wires and that all connections are secured. If bare wire is evident, call a service technician.
4. Check door interlock before starting operation:
   (a) Attempt to start the washer with the door open. The washer should not start with the door open.

Replace all panels that are removed to perform service and maintenance procedures. Do not operate the machine with missing guards or with broken or missing parts. Do not bypass any safety devices.

(b) Close the door without locking it and attempt to start the machine. The machine should not start with the door open.

(c) Close and lock the door and start a cycle. Attempt to open the door while the cycle is in progress. The door should not open. If manual latch is moved out of position the machine should stop.

If the door lock and interlock are not functioning properly, call a service technician.

6.1.2 End of Day

1. Clean the door gasket of residual detergent and foreign matters.
2. Clean the automatic supply dispenser and the lid inside and out with mild detergent. Rinse with clean water.
3. Clean the washers top, front and side panels with mild detergent. Rinse with clean water.
4. Leave loading door open at the end of each day to allow moisture to evaporate.

NOTE: Leave loading door open at end of each complete cycle to allow moisture to evaporate. Unload the machine promptly after each completed cycle to prevent moisture build up.

6.2 Weekly

1. Check the machine for leaks.
   (a) Start an unloaded cycle to fill the machine.
   (b) Verify that door and door gasket do not leak.
   (c) Verify that the drain valve is operating. If water does not leak out during the prewash segment, drain valve is closed and functioning properly.
2. Clean the AC drive box air filters.
   (a) Snap off the external plastic cover which contains the filter. Remove the foam filter from the cover.
   (b) Wash the filter in a mild soap solution or vacuum it clean. Replace if damaged. Operating the machine without filter will cause premature inverter failure.

6.3 Monthly

NOTE: Disconnect power to the machine at its source before performing the monthly maintenance procedures.

1. Each month or after every 200 hours of operation, lubricate bearing and seals. See instructions on the machine.

   (a) Use a premium grade lithium complex grease. Never mix two types of grease.

   (b) Pump the grease gun slowly, permitting only the following number of strokes:

   (a) Bearing grease fitting, 2 strokes

   (b) Seal grease fitting, 1 stroke.

   Do not pump the grease gun if grease comes out of the bearing housing. This can result in over lubrication, causing damage to bearings and seals.

2. If the machine is provided with automatic lubricators, check that they are injecting grease. Normally they last for approximately one year (see TSB016 for details). Mark new lubricators with installation date.

3. Clean the AC drive fins:

   (a) Remove the AC drive box cover.

   (b) Blow the fins clean using compressed air at a pressure of 60- 90 psi (4-6 Bar) or by using canned compressed air. Use care to avoid damaging cooling fan or other components.

   NOTE: No amount of visible foreign matter should be allowed to accumulate on fins, finger guard, cooling fan or fan filter. Replace damaged fan filters.

4. Use the following procedures to determine if V-belts require replacement or adjustment. Call a qualified service technician in either case.

   (a) Check V-belts for uneven wear and frayed edges.

   (b) After disconnecting power to the machine and removing all panels necessary for access to the drive belts, use the following method to verify that the V-belts are properly tensioned. Belt tensioning is straightforward, and accomplished by loosening the tension adjusting bolts and adjusting the belts to the proper tension. Then the bolts should be tightened. See figure 6.2.

   (c) Verify that V-belts are properly aligned by checking pulley alignment. Place a straightedge across both pulley faces. The straight edge should make contact with the pulleys in four places. See figure 6.1.

6.4 Quarterly

NOTE: Disconnect power to the machine before performing the quarterly maintenance procedures.

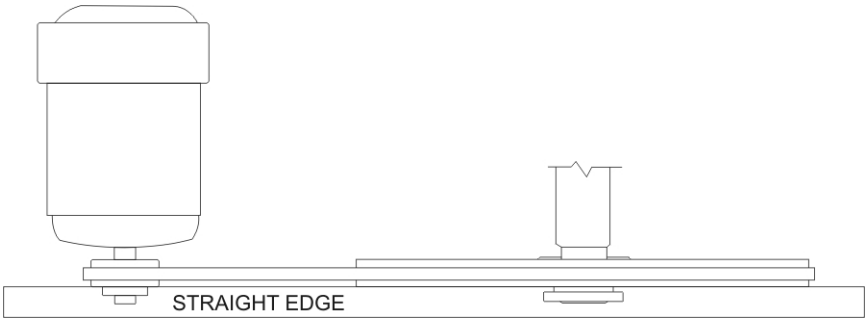

Figure 6.1: Proper Pulley Alignment

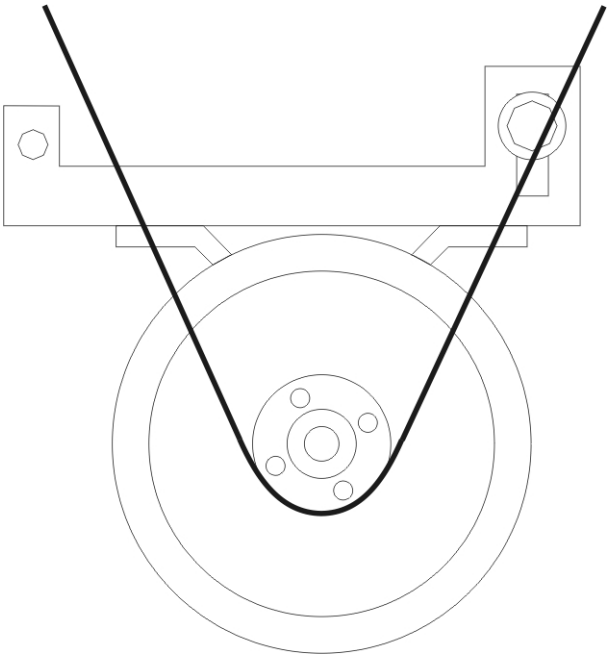

Figure 6.2: Belt Tensioning Bolt

1. Tighten door hinges and fasteners, if necessary.
2. Tighten anchor bolts, if necessary.
3. Check all painted surfaces for bare metal (matching paint is available from the manufacturer.)
   (a) If bare metal is showing, paint with primer or solvent-based paint.
   (b) If rust appears, remove it with sand paper or chemical means. Then paint with primer or solvent-based paint.
4. Clean steam filter, where applicable. See figure 6.3.
5. Remove back panel and check overflow hose and drain hose for leaks.
6. Remove top cover and check the supply dispenser hoses and hose connections.
7. Clean inlet hose filter screen:
   (a) Turn water off and allow valve to cool, if necessary.

Table 6.1: Belt Tension Guide

Model	in		lb	
SP-40/45	0.24	6.1	2.4	1.1
SP-60/65/75	0.29	7.4	4.3	2
SP-100/110	0.33	8.4	5.3	2.4
SP-130/135	0.3	7.6	4.8	2.2
SP-155/165	0.29	7.4	5.4	2.5
SP-185/195	0.52	13.2	7.7	3.5

(b) Unscrew inlet hose and remove filter screen.

(c) Clean with compressed air and reinstall. Replace if worn or damage.

8. Tighten motor mounting bolts and bearing housing bolts, if necessary.
9. Use compressed air to clean lint from motor.
10. Clean external water and steam filters

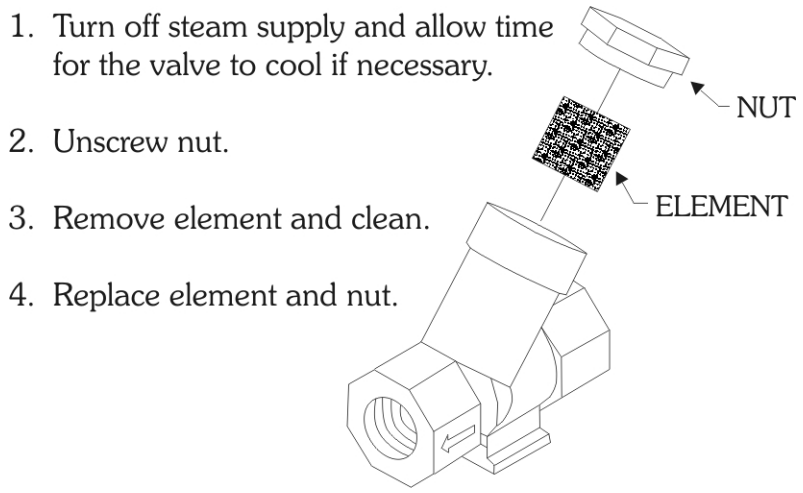
1. Turn off steam supply and allow time for the valve to cool if necessary.
2. Unscrew nut.
3. Remove element and clean.
4. Replace element and nut.
NUT
ELEMENT

Figure 6.3: Steam Trap Service

6.5 Care of Stainless Steel

Maintain the natural beauty of stainless steel and prolong its service life by following these steps.

1. Ordinary deposits if dirt and grease can be removed with detergent and water. The metal should be thoroughly rinsed and dried after washing. Periodic cleaning will help to maintain the bright surface appearance and prevent corrosion.

2. Contact with dissimilar metal should be avoided whenever possible. This will help prevent galvanic corrosion when salty or acidic solutions are present.

3. Salty or acidic solutions should not be allowed to evaporate and dry on stainless steel. They may cause corrosion. Ensure that the stainless steel is wiped clean of acidic solution residues.

4. Deposits that adhere to the stainless steel should be removed, especially from crevices and corners. When using abrasive cleaners, always rub in the direction of the polish lines or grain of the stainless steel to avoid scratch marks. Never use ordinary steel wool or steel brushes on the stainless steel. Use stainless steel wool or soft non-metal bristle brushes..

5. If the stainless steel appears to be rusting the source of the rust may actually be an iron or steel part not made of stainless steel, such as a nail or screw. One remedy is to paint all carbon steel parts with a heavy protective coating. Stainless steel fasteners should be used when possible.

6. Discolorations or heat tint from overheating may be removed by scouring with powder or by employing special chemical solutions.

7. Sanitizers or sterilizing solutions should not be left in stainless steel equipment for prolonged periods of time. They often contain chlorine, which may cause corrosion. The stainless steel should be cleaned and rinsed thoroughly of any solution containing chlorine.

8. When an external chemical supply system is used, make certain that no siphoning of chemicals occurs when the washer-extractor is not in use. Highly concentrated chemicals can cause severe damage to stainless steel and other components within the machine. Damage of this kind is not covered by the manufacturers warranty. Locate the pump below the washers injection point to prevent siphoning of chemicals into the machine.

Chapter 7

Service & Parts

7.1 Service

Service must be performed by a qualified trained technician, service agency, or gas supplier. If service is required, contact the distributor from whom the equipment was purchased. If the distributor cannot be contacted or is unknown, contact B&C Technologies for a distributor in your area.

For technical assistance in the United States, contact B&C Technologies:

(850) 249-2222 Phone
(850) 249-2226 FAX
parts@bandctech.com
www.bandctech.com

NOTE: When contacting B&C Technologies be sure to supply the correct model number and serial number so that your inquiry is handled in an expeditious manner.

7.2 Parts

Replacement parts should be purchased from the distributor from whom the equipment was purchased. If the distributor cannot be contacted or is unknown, contact B&C Technologies for a distributor in your area. Parts may also be purchased directly from the factory

NOTE: When ordering replacement parts from a dealer or B&C Technologies, be sure to supply the correct model number and serial number so that your parts order can be processed in an expeditious manner.

Chapter 8

Decommisioning

In the event that the machine must be decommissioned, follow these steps:

1. Clean interior of machine, both basket and shell.
2. Disconnect electrical power.
   (a) Shut of main power supply at the breaker box or main control panel.
   (b) Do not attempt to disconnect power supply wires from power supply. Have a qualified electrician disconnect power to machine at its source.
3. Disconnect gas/steam supply.
4. Disconnect exhaust system.
5. Remove the machine from its foundation pad.
   (a) Keep all panels in place to provide stability when moving the machine.
   (b) Verify that door is closed and secure
   (c) Place the machine on skid and bolt the frame to the skid. This will facilitate the removal of the machine on to a truck.
6. Recycle.

The manufacturer uses the highest quality material in their products so that those material may be recycled at the end of the product's service life.